LECTURES ON ADVANCED ECONOMIC THEORY

By the same author

FINANCES FOR SMALL SCALE INDUSTRIES IN INDIA

LECTURES ON ADVANCED ECONOMIC THEORY

K. T. RAMAKRISHNA
M A, M LITT, PH D
Reader in Economics
Osmania University

ASIA PUBLISHING HOUSE
BOMBAY - CALCUTTA - NEW DELHI - MADRAS
LUCKNOW - LONDON - NEW YORK

Kothapalli Tatachar Ramakrishna (1923)

PRINTED IN INDIA
BY SURAJIT C DAS, AT GENERAL PRINTERS AND PUBLISHERS PRIVATE LTD, 119, DHARAMTALA STREET CALCUTTA 13 AND PUBLISHED BY P S JAYASINGHE, ASIA PUBLISHING HOUSE, BOMBAY

To

My Young Fellow Students

in

Gratitude and Affection

PREFACE

This is a course of lectures on recent Economic Theory delivered to post graduates in the Department of Economics, Osmania University They were originally taken down in short hand by an enthusiastic young student, James David, and presented to me as a collection of notes, neatly type written, to my pleasant surprise at the end of the term Encouraged by his suggestion, I venture to offer it to a wider circle of readers who, he thinks, will benefit by it It has, however, been revised to make it suitable for publication in book form. I take this opportunity to acknowledge how much I appreciate and am touched by this token of affection on his part in giving me such an unusual gift But for it, this book might never have been written. I hope his faith in its usefulness to others is not misplaced and with all its imperfections due altogether to my own deficiency in my interpretation of the many great authors who figure in it, it will yet justify his youthful optimism and point the way to those who have lost it in the terrifying maze of modern economic thought and are wandering through its dark corridors, as I once did in quest of enlightenment!

I am, needless to say, deeply indebted to many eminent scholars whose work I have used in my class as I have acknowledged wherever possible in foot notes to these pages I have depended for my discussion of Definition, Scope and Method of Economic Science in no small measure on Lionel Robbins's *Essay On the Nature and Significance of Economic Science*, L. M Fraser's *Economic Thought and Language*, J M Keynes's *Scope and Method of Political Economy*, Barbara Wootton's *Lament for Economics*, J R Hicks's *Social Framework* and Alec Cairncross's *Introduction to Economics*, and for the study of the Theory of Choice and Consumer's Sovereignty, on Frederic Benham's *Economics* J E Meade's *Economic Analysis and Policy* and Barbara Wootton's *Lament for Economics* For the debate on the many controversial issues raised on the above questions, articles of Hawtrey, Harrod,

Cannan Fraser and Durbin in the *Economic Journal* and *Economica* provided much valuable material for my lectures

I have drawn extensively on Joan Robinson's *Economics of Imperfect Competition* for the study of Monopoly, Perfect and Imperfect Competition Kenneth E. Boulding's treatment of Discriminating Monopoly and Monopolistic Competition in his *Economic Analysis* and E. A. G Robinson's *Monopoly* were most helpful in my exposition of the problems involved The work of Alfred W Stonier and Douglas C Hague, *A Text book of Economic Theory* Paul A Samuelson's *Economics*, George G Stigler's *Theory of Price* J R Hicks's *Value and Capital*, were invaluable in my discussion of Indifference Curve analysis For Cost of Production, Employment, Distribution and Laws of Returns my debt to Stonier and Hague's work and E A G Robinson's *Structure of Competitive Industry* is immeasurable

My debt to my own students is immense for the intellectual contact I have enjoyed with them which has helped not a little in clearing up my own ideas for which I hereby dedicate this humble work to them

Osmania University
Hyderabad
March 1965

K T RAMAKRISHNA

ACKNOWLEDGEMENTS

For so readily and graciously giving me permission to use some of the diagrams and charts from their works I am most grateful to the following authors and their publishers —

Frederic Benham Economics, Table on P 87 and Figures 13 & 14 Appendix to Book I Indifference Curves Sir Isaac Pitman & Sons Ltd. London 1953

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PART ONE

DEFINITION, SCOPE AND METHOD OF ECONOMICS

I

DEFINITION, SCOPE AND METHOD OF ECONOMICS

I RECENT CONTROVERSIES ON QUESTIONS OF DEFINITION, SCOPE AND METHOD OF ECONOMICS

WE SHALL begin with the question of the definition of economics and deal with some of the recent controversies regarding the definition and scope of economic science We might take as the starting point of our discussion Prof Robbins who is one among the recent economists to make a systematic study of the subject of definition The previous economists belonging to the Classical school such as Adam Smith, Ricardo, Mill, Malthus and those belonging to the Neo-classical school like Marshall, Pigou, etc, failed to make a systematic study of this question of definition and scope of economics We shall in the course of our discussion touch on all the aspects of the problem of definition Earlier writers, both of the Classical and the Neo-classical schools, did not pay sufficient attention to the question of definition and method in economic analysis However, to begin with Robbins, we might consider why Prof Robbins rejected the definition provided by Marshall and others and substituted a definition of his own In 1932, therefore, Robbins wrote his famous essay which broke new ground and completely altered the conception of economic science[1] Robbins rejected what he himself called the 'materialist' definition of economics, the one which came from the Neo-classical school These economists defined economics as the 'study of the causes of material welfare' But to Robbins such a definition of economics in terms of material welfare implied a classification of welfare into material and non

[1] *An Essay on the Nature and Significance of Economic Science*, Lionel Robbins, Ch I, 1949

material The main reason why Robbins rejects this definition is that in the light of this definition the science of economics *will be restricted in scope If this definition of economics* was accepted a great part of economic life would remain outside the scope of economic science In order to prove how the materialist definition of the Neo-classical school would be restricted in scope he takes up the theory of wages In the light of the materialist definition the theory of wages would be *restricted For instance wages paid to sewage collectors* can be covered by the theory while wages given to musicians will remain outside the scope of the theory This is because the former contribute to material welfare by their labour while opera singers contribute to non material welfare Wages spent on tangible commodities like bread would contribute to mate*rial welfare but a visit to the theatre will result in* non material welfare Looking at the wage question either from the point of view of the earning of wages or from the point of view of spending of wages the theory is restricted Although the Neo-classical economists Marshall and others have not deliberately intended such a distinction between the material and the non material still *in their application of economic analysis* they seem to imply such a distinction between material and non material Robbins takes up the contention of Cannan that political economy of war is a contradiction in terms That is to say while war does not contribute to material welfare economics or political economy is concerned with it War results in destruction while economics *is interested in pro*moting material welfare But to Robbins war has economic implications War involves using of resources and diversion of factors

Another argument to demolish the 'materialist' definition is the acceptance by the Neo-classical economists of the non productivity theory of labour Adam Smith distinguishes between productive labour and unproductive labour Labour resulting in tangible wealth was regarded as productive while labour resulting in intangible wealth was regarded as unproductive labour This distinction is not valid For example Prof Cannan who belongs to the Neo-classical school considers all labour productive The labour of cooks equally with the labour of opera singers is regarded as productive This

is because labour is paid for Labour is scarce and being scarce labour is regarded as economic Therefore after all, labour is productive whether it results in tangible goods or intangible goods It is not possible to accept the materialist definition in the light of this However, labour which might produce tangible wealth might be regarded as unproductive in the event of absence of demand In peace time the labour expended on the production of armaments would be regarded as unproductive since it is not wanted

Prof Fisher goes still further in regarding all labour as unproductive or immaterial in their ultimate effect If there is so much inconsistency why did the materialist definition persist? One reason Prof Robbins puts forth for the blind acceptance of the definition in terms of material welfare is that *Anglo-saxon writers are not in the habit of going deep into* the question of scope of Economics However this reason does not adequately explain the position of Prof Cannan who is one of the Neo-classical economists Cannan, unlike other economists, arrived at his conclusions systematically He starts with the simplest form of economic organisation—the isolated economy In the Crusoe economy, we might broadly classify the activities of the isolated individual into two parts If Robinson Crusoe spends his time in digging potatoes, his labour is economic If he were to spend his time talking to his parrot, it would be non-economic Thus, in the case of an isolated individual it might be possible to distinguish between these activities of the individual But what if Crusoe is rescued goes home and talks to his parrot for a living? Would that be non-economic?

In the case of Prof Cannan we cannot dismiss this question of acceptance of earlier definitions by saying Cannan has copied his definition from others This might be said of others Now, therefore, since such a definition of the Neo-classical economists has *certain defects which make it restricted in* scope and self-contradictory, Robbins tries to give a definition of his own He wants to give a more scientific definition which is analytical. He does not want to divide welfare into two kinds Ultimately, human behaviour cannot be so divided Economists should lay emphasis on that aspect of human behaviour which arises out of certain fundamental facts in

economic life In order to formulate his definition Robbins starts from the same point that Cannan started from He takes the simplest form of economic organisation He considers the activities of Crusoe

Multiplicity of ends scarcity of means alternative applicability of scarce means and different degrees of importance of ends characterise economic life It is not enough if there should be one or the other of the conditions These must exist together and produce economic phenomena They produce the two economic problems of scarcity and choice Robbins points out that in the light of his definition in terms of scarcity and choice the scope of the theory of wages is widened It can now cover all kinds of wage payments To Robbins there is no contradiction between war and political economy In war you are using scarce means War creates problems of economy He does not look at the problem from the point of view of material or non material welfare He looks at it from the point of view of economy and scarcity of means All labour has got an economic aspect and therefore all labour can be covered by the theory of wages in the light of the scarcity definition of Robbins In this sense Robbins s definition is analytical It is not classificatory It analyses behaviour Unlike the materialist definition the scarcity definition judges behaviour of men from the point of view of four fundamental conditions viz (*i*) multiplicity of ends (*ii*) scarcity of means (*iii*) alternative applicability of scarce means and (iv) different degrees of importance of ends From this point of view therefore there is an economic problem in an isolated economy and in an individualist economy

II CRITICISM OF SCARCITY DEFINITION AMONN WOOTTON CAIRNCROSS

ROBBINS S definition was based on the study of scarcity of means and choice between multiple ends Economics is a science which studies human behaviour as a relationship between ends and scarce means which have alternative uses * In the light of this economising of resources is present in an

isolated economy, an exchange economy and a closed communist society But in an isolated economy only an individual faces the problem of economising scarce means in order to satisfy ends Therefore, economic analysis has little scope. Likewise in a communist society, there is no scope for economic analysis to the same extent as in an individualist exchange economy In a communist society, all decisions relating to production and consumption are made by a planning body Therefore, the problem of choice is comparatively simpler The decisions as to what to produce and what to consume are here made by the economic dictator Hence, they do not present any complex economic problems as they do in a capitalist society or an individualist exchange economy In such an economy the individual can decide what to buy or sell, so that the decisions of all the individuals in a capitalist society will act and react on each other and thereby affect profits, wages, prices, interest rates and taxes As a result of such reactions which spread throughout the economy, economic phenomena are produced In such a state of economic life, economic analysis has maximum scope It is unnecessary in an isolated economy in as much as problems of scarcity, choice and economy are simple In a communist society, the scope for economic analysis is restricted However, to Prof Robbins economic problems are present in all forms of economic organisation To this Prof Amonn objects on the ground that economics, being a social science, is relevant only to an individualist exchange economy where one type of social behaviour exists—social behaviour under freedom of exchange, freedom of private property and freedom of choice Behaviour outside these institutions is of no interest to the economist Robbins regards this as unreasonable The fundamental conditions governing economic life are present even outside as inside such a system In an isolated economy exhange may not exist but exchange is not fundamental, while scarcity and choice are Hence, problems facing the individual in an isolated economy have an economic aspect and therefore economic science must be relevant Prof Cairncross regards exchange as an essential condition for economics to study economic phenomena[2] Although in an isolated economy

[2] *Introduction to Economics* Alec Cairncross Ch I, 1955

scarcity and choice exist such problems are of a private nature and in the absence of exchange their effects do not go beyond the individual Similarly Barbara Wootton defines economics as a study of market processes,' which implies a study of exchange[3] Thus although these economists partly subscribe to the opinion of Robbins by recognising the significance of scarcity and choice they differ from him Comparing the 'materialist and 'scarcity' definitions, we find some basic differences The materialist' definition seems to recognise only economic phenomena and behaviour arising from scarcity of materials while Robbins's definition would count economic behaviour arising from scarcity of services and time which are non material Robbins does not consider the materiality of goods as essential but scarcity of means, whether material or non material as important in testing the economic character of behaviour Since the 'materialist' definition stresses the material aspect of the means of production, it misrepresents the science of economics The 'scarcity' definition, being analytical, represents the science better as it lays stress not on different kinds of behaviour but on one aspect of behaviour under the pressure of scarce means in relation to many ends On the whole we may reject the materialist' definition But we do not reject the body of knowledge which it describes The 'scarcity' definition widens the scope of economic science while retaining the body of knowledge represented by the 'materialist' definition The 'scarcity' definition unlike the 'materialist', will enable the theory of wages to cover wages paid to sewage collectors and members of an orchestra as well as their expenditure on bread and a theatre ticket Similarly, the contradiction in the term 'political economy of war' pointed out by Cannan no longer exists in the light of Robbins's definition because war involves the use of scarce means and choice between alternatives both of which lead to economy Contrary to Cannan's opinion political economy of war is perfectly valid Again the 'scarcity' definition would remove inconsistencies inherent in the acceptance of 'materialist' definition by Cannan and his acceptance at the same time of a non materialist definition of the productivity of labour The 'scarcity'

[3] *Lament for Economics* Barbara Wootton Ch II and V 1938

definition thus supplies some of the deficiencies of the 'materialist' definition

L M Fraser and Edwin Cannan on Robbins's 'Essay

Fraser attempts a criticism of Robbins's book—*Nature and Significance of Economic Science*[4] As the date of the journal shows, Fraser's criticism followed soon after Robbins published his book in 1932 In Fraser's view Robbins wrote his book with two main purposes, viz., (i) to define the scope of economics and (ii) the application of economics to public policy Robbins considered the definition of economics important because the subject had attained unity and secondly the time was ripe for defining the subject. A more weighty reason for attempting a fresh definition was to prevent the economist from straying into irrelevant subjects, which he considers a waste of time The economist should be concerned with the problem of economy due to scarcity of means However, the economist is not concerned with ends as such, economics is neutral between ends He is only concerned with the use of means to achieve given ends As such, the economist is interested in how the means are used, whether they are used economically or uneconomically Therefore, it appears that the economist does not approve of extravagance in using means The economist aims at economy In that case economy is an end How can we then say that the economist is indifferent to ends[5] Further, Robbins claims to have widened the scope of economics by offering his definition in terms of scarcity, choice and economy But as a matter of fact, Robbins has restricted the scope of the science by urging economists to confine their attention purely to price and to dissociate from other subjects like psychology, economic history, ethics, technology and so forth[6] This is because hitherto some economists had applied psychology to problems of value, as for example in the subjective theory of value of Gossen

Similarly, technology is of no interest to the economist

[4] 'How Do We Want Economists To Behave', L. M Fraser, *Economic Journal* p 555, 1932

[5] *An Essay On the Nature and Significance of Economic Science*, Robbins Ch IV Sec 4, 1949 [6] *Ibid*

except in so far as it affects cost and price Likewise, the study of the evolution of economic institutions undertaken by economic history should be avoided The economist should avoid these other branches of knowledge and devote himself to the central problem of valuation The argument of Robbins sounds reasonable enough but is it necessary for every student of economics to study only value? For one thing, each and every economist cannot expound pure theory and there are economists enough to study other allied problems This view of Robbins is erroneous because the science need not be based on deduction to produce fruitful results Many laws in physics and biology are based on induction and yet they are useful In the same way, economic laws may be based on induction However in economics certainty is hard to achieve For instance, in the matter of income redistribution a measure of uncertainty is inevitable In a community where incomes are unequal redistribution is attempted through transfer, in order to increase welfare When income is transferred from a rich to a poor person, the welfare or the satisfaction of the rich man may be decreased and that of the poor man may be increased It is, however, difficult to say by how much the welfare of the rich man has fallen and that of the poor man has risen because satisfaction is not measurable and the satisfaction of two persons cannot be compared But on this score can we abandon a levelling of the incomes to bring about greater equality although a precise measure of welfare and satisfaction may not be possible? For example, a rich man may have a low marginal utility of money while a poor person may have a high marginal utility so that a transfer of income from one to the other would bring about greater total welfare One example cited by Fraser illustrates this point A deaf person may have a gramophone but does not use it, while a poor music lover might want a gramophone so that the transfer of the gramophone from the former to the latter will obviously increase satisfaction Therefore, in redistributing income it may not be possible to depend upon exact measurement of satisfaction One might have to depend upon arbitrary forces such as intuitive commonsense The fact that satisfaction does not lend itself to measurement or comparison should not be an objection to redistribution Prof Robbins seems to

be of the view that due to uncertainty inherent in problems of welfare, it is not proper for an economist to attempt such a redistribution Satisfaction is subjective to each person, as such the economist cannot tamper with people's welfare Another objection of Robbins to income redistribution is that it involves value judgements and as a positive science economics cannot make value judgements Patently such an objection is unreasonable It attempts to make economics exact. Robbins discriminates between exogenous and endogenous factors governing economic situations, endogenous factors being those which operate from within Such factors or forces lend themselves to reasoning, theoretically, for example, the forces of supply and demand which explain fluctuations in value Exogenous factors are external to an economic situation Therefore, they might not lend themselves to reasoning Thus endogenous factors are more certain than exogenous factors As an example of endogenous factors operating in an economic situation, any change in the value of money may be ascribed to changes in its quantity On the other hand, if a country goes off the gold standard, a change in the value of money is due to a change in the monetary policy of the government. Therefore, it cannot be assessed Secondly, both factors might operate in conjunction, e g, a stock exchange boom may be explained by speculation which may be regarded as an exogenous factor as well as an increase in capital investment which may be considered an endogenous factor But how to separate the endogenous from the exogenous? The economist, therefore, cannot disregard exogenous factors as negligible Robbins also discriminates between deductive and inductive To his mind, of the two, deduction is more scientific and reliable while induction, although useful, is less important

This discrimination between deduction and induction does not seem to be sound Even though induction by itself is ineffective without deduction, induction is no less important Both deduction and induction are different tools of research and not fields of research and they are complementary to one another Fraser says "Deduction without induction is empty and induction without deduction is blind" This discrimination between exogenous and endogenous factors and deduction

and induction which Robbins makes cannot be explained by saying that deduction and endogenous factors are more important in theory while induction and exogenous factors are *more important in practice because* theory and practice in the case of social sciences are inseparable Such a divorce between theory and practice may be valid in natural sciences like physics and biology where the scientist can pursue pure research leaving the application of results of his research to others The physicist and the biologist engaged in fundamental research can pursue knowledge for its own sake and knowledge acquired may be applied by engineers or doctors, stock breeders and electricians Economics is not a pure science in the sense of one gaining knowledge as an end in itself The economist has to apply his knowledge in solving practical problems Therefore, economics is an applied science It is fruit bearing rather than light bearing [7] It can solve practical problems through co-operation with other sciences Economics need not be defined as Robbins wants to do If the economist does not go outside the theory of value, he will be ineffective in solving problems like levelling of incomes, bringing about greater social equality in the economy or the community abolition of private property, greater harmony between producers and consumers through regulation of trade or control of monopoly the desirability or otherwise of adopting socialism or co-operation All these problems depend on different sciences such as economic history, psychology ethics politics and the like For solving them, we should understand their background To understand existing economic institutions, we must know economic history which deals with Economic institutions like private and public property, markets and marketing evolution of business organisation, factory systems since current problems are conditioned by these institutions Psychology similarly helps in understanding economic behaviour such as rational and irrational choice All progress in the past in the development of economic science was largely due to the knowledge of other sciences which economists had, a knowledge of law and history, politics and business, mathematics and ethics, e g J S Mill was a philosopher and political thinker and an economist For

[7] *Economics of Welfare* A C Pigou Ch. I, 1950

fruitful contribution to economic science the thinkers of the past drew on other sciences If economic development depends so much on other branches of knowledge and is closely interrelated with them, there does not arise any need for defining economics in precise terms One might define economics as "that which interests the economist." A good economist must be interested in everything since everything in life may have a bearing on practical questions An economist can fulfil his functions effectively as an administrator or a statesman, a counsellor or an adviser only by knowing other subjects

A book review by Prof Cannan was published in the *Economic Journal* of 1932 in which Cannan sets down his defence of the 'materialist' definition and his criticism of Robbins[8] Cannan looks upon the economic system as a huge machine whose aim is to promote economic welfare while Robbins thinks of the economic system as a series of economic relationships between ends on the one side and scarce means on the other, i e, relationships between wants and wealth or money and goods Cannan considers it the function of economists to explain the structure and working of this economic machine and to suggest improvements in the system where necessary Robbins is interested in the economic relationships as they exist but not in reforming them, since he regards economics as a positive science In discussing economic significance, Robbins considers such significance in relative terms, e g, the economic significance of productive power is due to the demand for any commodity If the demand should disappear the utility of the goods goes and therefore, productive power has no economic significance Armaments in war are productive power due to the demand for them and in this relationship between armaments and the demand for them consists economic significance

As against these views of Robbins, Cannan regards economic significance in a different way He considers Robbins's stand on this question as narrow To Cannan when war ends and the normal social order is again restored, or peace returns,

[8] Review of 'Nature And Significance of Economic Science', *Economic Journal*, p 424 1932.

it is not important that armaments may have no further value, i e, they would have outlived their utility Robbins, therefore, would say that the moment armaments are no more useful or in demand, the economic significance or the productive power of armaments ceases The economist will no more be interested in them From the point of view of Cannan, when war ends and the normal order is established, it is much more important from a moral standpoint Thus, Cannan considers the termination of hostilities and coming of peace as of primary importance and the fact that armaments have lost their usefulness only of secondary importance This difference between Robbins and Cannan is due to the fact that Cannan regards economic science as a normative science and Robbins regards it as a positive science As such while Cannan is interested in moral issues in general, Robbins is not Robbins regards economic significance purely from the point of view of the relationship between the commodity and demand This stand disregards the moral side of the question On the other hand, Cannan as a normative scientist is concerned about the moral implications of a problem Therefore, it is all for the good when peace is established because war, to Cannan, is evil and the economist cannot reconcile himself to an order which goes against welfare Robbins being a positive scientist does not take into account the nature of ends To him ends are given Only the means of satisfying ends may have an economic side to them The economist is interested in knowing whether ends are achieved economically or uneconomically or, in other words, whether in achieving ends, means are wasted or economised Cannan, on the other hand considers the nature of ends as important as the nature of means To the economist ends are important because only by aiming at certain economic ends, can welfare be promoted In the past any change in the economic system for the better was possible because society aimed at certain beneficial economic ends The economist cannot disregard the ethical side of ends He has to take sides and discriminate between good and bad ends and advise on the choice of ends If not, the economist will be failing in his duty Society expects the economist to guide it in regaed to what is good or bad Thus Cannan stresses the utilitarian side and, as such, only by making moral judgements can the

economist serve the public It is because of the practical utility of economics that work in the economic field in the form of books, lectures in the universities and research work had been done In defence of the 'materialist' definition of economics, Cannan points out the misunderstanding of Robbins when interpreting material and non material welfare Robbins in his book illustrates material welfare by bread, non material wel fare by concerts but as a matter of fact this was not what the exponents of the 'materialist' definition meant in classify ing welfare into material and non material The latter was intended to cover such things as the strength, or consolation one receives from religion and emotions like joy and sorrow through birth and death of one's dear ones Concerts and cir cuses were not meant to be included in non material welfare as Robbins seems to have thought Robbins, therefore is accused of misinterpreting non material welfare as understood by Cannan and others and having been unjust to the 'materia list' definition

We were discussing Prof Cannan's defence of the 'materia list' definition One criticism of Robbins against the 'materia list' definition was based on the acceptance of the definition of economics in terms of material welfare inspite of the nume rous inconsistencies in the definition In the case of most economists the acceptance of the 'materialist' definition was due to inadequate attention paid by English economists to ques tions of method and scope This is, however, not true of Prof Cannan Prof Cannan arrived at his definition by examining *economic life under different conditions, viz., in an isolated economy and a communist society In an isolated economy,* the activities of the isolated individual might be divided into those making for material welfare and those for non material welfare Even so in a communist society, the executive in charge of allocating resources might devote so much labour power to the production of real wealth and so much labour for providing non material services If the labour power produces more bread, material welfare is increased If it provides circuses, non material welfare increases Therefore, in allocat ing resources between the material and non material, accord ing to Prof Robbins, the problem of allocation is half within and half outside the theory of production To this Prof Can

nan replies that such a problem is both a problem of economics and of life. Hence it is right and proper that such problems are not covered entirely by economics. In support of this argument, Prof Cannan cites an example. A person may be faced with two alternatives: (i) To work overtime and improve his economic prospects or (ii) to enjoy leisure and spend more time on the young lady he is wooing and improve his matrimonial prospects. This problem has both an economic and a non economic side.

III DEDUCTION VS INDUCTION

PROF Harrod points out in his article[9] the limitations of the deductive method and the importance of induction. Deduction helps in explaining causal relationships on the basis of which generalisations are made. To confirm these generalisations evidence collected inductively is necessary. In gaining economic knowledge by research we may distinguish different phases or stages: the first being arm-chair cogitation or speculation and reasoning on the basis of hypotheses or assumptions of a scientist, the second being the use of statistical methods by statisticians to analyse data and finally the confirmation of the generalisations made by theorising. To carry out research, experts in different fields specialising in deduction and induction, are necessary as professional economists are pre-occupied with teaching and administration. The development of statistics is an asset to the research worker in gaining knowledge. One can distinguish broadly therefore different approaches to the study of economic problems. Consequently, there is difference of opinion among economists as to which is the most fruitful source of fresh clues for further growth of knowledge. One view is of Prof Wesley Mitchell that empirical or inductive data can yield useful clues when arranged and rearranged and interpreted differently. Another view is that existing theory can be made to yield useful clues when more intensively studied. Prof Harrod is of the opinion that either of the two views may be correct, i.e., both the inductive method and the

[9] 'Scope And Method of Economics', R F Harrod, *Economic Journal* September 1938

deductive method may be effective in acquiring knowledge However, in the past, since the time of Adam Smith, many economists have supported deduction as the more effective of the two methods and attributed many important generalisations to the deductive approach. In examining the claims of deduction one should bear in mind certain limitations from which deduction suffers In social sciences the experimental method is denied to the student unlike in natural sciences like genetics where the study of heredity is based on experiments However, even in natural sicences the experimental method may be im possible in such sciences as astronomy but, by and large, natural sciences have the advantage of experimentation over social sciences Therefore, theories in economics cannot be tested Further, due to plurality of causes even hypotheses or assumptions underlying economic theories cannot always be tested by experiments This is confirmed by the trade-cycle theory as the causes of trade-cycles may be various Nor can we say in regard to deduction and induction that one or the other is alone right or correct. They have both their value e g, many important economic laws and generalisations have been based on observation. The well known Gresham's law in monetary theory was largely founded upon the study of currency under bimetallism Similarly, generalisations about the behaviour of prices in booms and depressions are again based on the inductive method On the other hand, some laws have had their origin in abstract reasoning or deductive studies The theories of value and distribution have been developed on the basis of deductive laws, viz, laws of supply and demand and diminishing marginal utility The laws of supply and demand as well as the Law of Diminishing Utility are axiomatic being based upon certain assumptions about human nature Therefore, theories based upon these laws cannot possibly possess absolute certainty but a large measure of probability Hence, predictions cannot be made in specific cases with the aid of these laws and yet classical economists have recommended public policies based on laws of demand and supply In the past, the policy of free trade was due to the faith in unregulated forces of supply and demand In more recent times the problem of trade-cycle has demanded solution and the solutions coming from different quarters have mostly been based

on induction, so much so there is wide divergence of opinion among theorists who have studied the phenomena

iv 'SCIENTIFIC ECONOMICS'

PROF Harrod criticises the stand of the so-called scientific school of economists by discussing the economic criteria which Prof Adam Smith laid down by means of which the economist may judge economic situations and behaviour The economic criteria may be illustrated as follows

If a person A prefers commodity X to commodity Y, he should have X or if a person B prefers work X to work Y, he should have X That is, the preferred good is the economic good in the example above, commodity X in the case of A and work X in the case of B This is not approved by some modern economists, especially Prof Lionel Robbins These economists criticise the advisory capacity of the economist They compare economics with natural sciences and economists with natural scientists In natural sciences, theory and practice may be separated Similarly, Robbins and others are of the opinion that the functions of the economist is to discover causal relationships and point out the consequences of given causes But the Economist cannot recommend any course of action in the matter of income redistribution It is evident that such redistribution is necessary as there is inequality of income Thus, Prof Marshall has shown that the marginal utility of money to a beggar is greater than to a millionaire It follows, therefore, that money should be transferred from the rich to the poor While recognising the fact of inequality, economists of the scientific school take objection to the redistribution of income since, according to these economists, income redistribution would mean economics being unscientific The redistribution of income must necessarily involve the measurement and comparison of utility from income and such measurement or comparison is impossible as satisfaction is subjective However, one may know intuitively that there is scope for increasing welfare by transferring goods from the rich to the poor In other words, we have a shrewd suspicion that the beggar in Marshall's example will derive

greater benefit from two pence than the millionaire This objection seems untenable since economics is not an exact science like natural sciences Very often economists depend upon conjecture in studying problems The trade-cycle theory is largely based on conjecture Hence, the economist cannot remain aloof from practical problems on the score that he would be unscientific if he did so In spite of the limitations under which the economist must function, due to his training and the equipment and technique of economic analysis which he has, the economist is best fitted to unravel complex problems of practical life, e g , Prof Pigou in his Study of Public Finance[10] in relation to income redistribution has made a thorough analysis of the various implications of redistributing income by altering the tax structure in the community A more weighty objection that may be brought forward against income-redistribution may be that such redistribution may have social and political implications, besides economic implications Therefore, social and political consequences of redistribution of income must lie outside the scope of the economist

In discussing the limitations of deduction Prof Harrod examines the law of demand which is a deductive law stating the relationship between demand and price Deductive economists such as the classical economists have attached a great deal of importance to the law of demand and claimed that the law is highly authoritative and can be made the basis for predictions The causal relationships embodied in the law of demand may be stated in the form of an equation composed of different economic quantities Some of these quantities are known while others are unknown The unknown quantities are functions of known quantities, e g , the equation may consist of prices and quantities demanded A change in price may become known so that the possible change in demand may be forecast since demand is a function of price Thus demand for goods is a function of their price The demand for factors of production is a function of factor prices If, therefore price alters, demand must alter as the price-demand relationship is governed by the law of demand The higher the price, the smaller the quantity demanded, the lower the price, the greater the quan

[10] *A Study in Public Finance* A C Pigou

tity demanded Armed with th s general law of demand one might be able to say how demand would respond to price That is the law of demand indicates the direction of change in demand or how demand expands or contracts But the law does not tell us the extent of change in demand or by how much demand expands in response to a given fall in price and by how much demand contracts in response to a given rise in price The deductive law of demand thus lacks quantitative precision and as such it might not be very helpful in measuring demand in relation to price To make the law of demand more precise and useful in making predictions regarding changes in demand some economists have attempted to make inductive studies of the relationship between demand and price Prof Douglas and Dr Schultz have attempted to collect empirical data in support of the law of demand to derive more precise results This discussion throws light on the inherent shortcomings of deduction as an exclusive method in economic analysis It also incidentally brings out the importance of induction since the limitations of deduction might be overcome to a certain extent with the aid of empirical or inductive data

V STATIC ECONOMICS VS DYNAMIC ECONOMICS

AFTER discussing the need for induction and the limitations of deduction, Prof Harrod makes a case for a dynamic approach to the study of economic problems i e he suggests the development of dynamic economics as against static economics Static economics may also be called economics of stationary states a stationary state is hypothetical in which economic phenomena are beyond the influence of external economic forces Therefore it may be described as a closed economic system and being outside the influence of economic forces it may be said to be isolated In other words in such a system economic life is static Various economic quantities remain essentially unaltered Thus the size and composition of population are static since the forces governing population operate in a manner whereby an increase in population is counteracted by a decrease and the birth rate and the death

rate balance each other so that eventually the population is static. Similarly, the stock of goods in a stationary state is static as the rate of consumption and the rate of production are constant. Likewise, as the different forces remain in equilibrium in the market, prices are constant. A static economic system may be compared to a ball rolling at a constant speed, neither gaining momentum nor losing speed. Another analogy may be that of the forest in which trees sprout, grow and perish but the composition of the forest remains unaltered. Economic life in such a state may be at a stand-still as the various forces at play operate at a constant rate. A dynamic economic system is the antithesis of a static economic system, i.e., an economic life which is progressive, various quantities constituting economic life being in a constant state of flux. Populations increase and decrease, the stock of goods changes. A study of such changing quantities constitutes dynamic economics. A dynamic approach must supplement the study of hypothetical stationary states to enable economists *to lay down causal laws or generalisations*. For example, a static approach to the study of prices is the study of equilibrium price, *i.e., a price which is in equilibrium due to* equilibrium between demand and supply. A dynamic approach on the other hand would be to study prices as they fluctuate, that is to say, to study price movements. A dynamic approach is more realistic as the concept of an equilibrium price is unreal. Prices are never in equilibrium, that is, they are never at rest since supply and demand are never at equilibrium. One always exceeds the other resulting in the rise and fall of prices, because conditions of demand and supply alter, leading to relatively greater supply, causing a decline in prices or a relatively greater demand, causing a rise in prices. Therefore, as a method of analysis the study of equilibrium price may be of value. However, since the equilibrium price is not *true to life whereas price movements are more real, the study* of prices as they change will be even more worthwhile. In regard to trade-cycles, economists have *tended generally to study* variations in trade, resulting in booms and depressions, in a static way, i.e., in studying the trade-cycles, economists have studied the phenomenon as a transition from one static equilibrium to another static equilibrium. It would be better if

economists study the trade-cycle consisting of booms and depressions as a continuous flow under steadily operating forces Such an approach would produce better results

VI ECONOMIC RESEARCH

PROF Durbin deals with the place of deduction and induction in economic research [11] With regard to the use of these and their utility there is no serious controversy All economists agree that deduction as well as induction are necessary However, the difference is in the emphasis placed by different economists on the different methods Some regard deduction based on hypotheses as more fruitful while granting the usefulness of induction Prof Robbins is of this view Others, like Sir William Beveridge and Barbara Wootton prefer induction based on observation as being more effective but at the same time recognise the importance of deduction But results of research work in the economic field have been disappointing and Prof Durbin offers an explanation for this Although deduction as well as induction have been used by research workers they have not used both the methods simultaneously Some have based their work exclusively on deduction while others have depended entirely on induction Consequently, literature in pure theory and empirical studies has grown side by side as proved by the spate of books and journals produced Economists like Prof Hicks and Maurice Dobb have built up theories based on assumptions Prof Hicks says "we shall assume a community which is wholly engaged in the production of a single homogeneous good which good we shall call bread" [12]

Prof Dobb in his *Political Economy and Capitalism* says 'let us suppose for example a community where the sole production and also the only finished commodity which its inhabitants buy consists of boots" On such assumptions theories are built up and these assumptions being unrealistic, theories founded on them are unrealistic On the other hand,

[11] Methods of Research A Plea For Co operation in the Social Sciences E F M Durbin *Economic Journal* June 1938

[12] *Economic Journal* September 1935

if these theories were also based on observation, they will be closer to life This does not, however, imply that assumptions are unimportant Assumptions in economics play the role which mathematics plays in physics But these assumptions must have the support of facts Similarly, in inductive studies vast amounts of data have been gathered Statistics for every conceivable quantity are collected as shown by economic journals Thus, changes in the physical output of agricultural farms, return to capital in the gold industry, cotton indices, profits of professional speculators are all collected. These data have grown without being used to deduce generalisations which can act as guiding principles. To make such data more fruitful conclusions must be derived These facts go to show that the tendency in economic research has been for the exclusive development of theory and collection of information Such independent work by theorists as well as inductive workers has made research barren Only if there is a synthesis of deduction and induction or reasoning on hypothesis based on observation and data can it lead to greater harmony among economists on various economic questions which have been controversial Explanations of trade-cycles are at variance with each other because of the numerous theories seeking to explain changes in trade If these theories of the trade-cycle were supported by factual data the differences among trade-cycle theorists may be resolved

Union of Social Sciences

Even supposing there were a synthesis of deduction and induction, could economics achieve a scientific status by getting results which can be made the basis for reliable generalisations? In general, results in economics as in other social sciences may not be as precise as the results of natural sciences While this may be admitted, the reasons given by social scientists for this fact are often untrue Social scientists regard social problems as highly complex This seems to imply that problems of a physical and biological nature are simple. As a matter of fact, problems faced by the early biologists and physicists of the 16th and 17th centuries were no less complex Again, social scientists attribute absence of precision and

exactness in results in social sciences to the fact that in social life experimentation as understood in natural sciences is not possible While this is true in the place of the experimental method social scientists have other methods open to them which may be less effective than the experimental method but which can serve their purpose The method of comparison is one such substitute for experiment In this method common features in diverse situations may be observed and their causes determined A second substitute for experiment is the method of prophecy which may confirm or disprove hypotheses Therefore, although these methods are not as good as the experimental method, the socical scientist can achieve results with their aid

Further although the reasons offered by social scientists to explain the imperfections in the results obtained from the study of social phenomena may not be accepted, the results of social sciences must differ from those of natural sciences This is largely due to the nature of the material with which social sciences deal While natural sciences deal with inanimate objects, social sciences deal with human nature and behaviour, and human beings in their behaviour are governed by a free will and knowledge gained through experience Therefore, unlike inanimate objects people do not respond to given causes always as expected They act under various influences, internal as well as external Nevertheless like natural scientists social scientists have to study social phenomena by relying on hypothesis, observation and verification in order to lay down generalisations In doing this satisfactorily, the social scientists should depend upon both deduction and induction, that is no research work should lack deduction or induction It must be based upon theorising on assumptions and evidence collected empirically

In addition to such a union of deduction and induction to achieve fruitful results Prof Durbin advocates closer co-operation among various social scientists Before examining the practical ways of such co-operation he criticises the position of social sciences and their relations to each other and to bring out the shortcomings of social sciences, the merits of natural sciences are considered

Natural sciences are concerned with different sections of

nature, each section being the object of study of a separate natural science Nature is divided into different forms of life, plant life, animal life and each form of life is studied by different natural scientists, botanists, zoologists and so on Natural sciences owe their progress and development to the fact of such division of nature into compartments The whole of nature cannot be studied by a scientist alone Similarly, for the study of society or social life different aspects of social life are distinguished so that there is a difference in the study of nature and society While natural sciences study independent objects, social sciences study different aspects of social life

Economics studies the economic aspect of social behaviour, politics the political aspect, law the legal aspect, economic history the economic aspect of general history, political history, the political aspect and so on. Social behaviour is studied by students of different social sciences, each aspect being governed by a set of conditions, political, economic, legal or otherwise, but the study of these aspects does not constitute the study of independent objects, unlike in natural sciences. In what way can social sciences be made to study independent objects which have a more real existence? Only through study of independent objects in their entirety can social sciences progress In social life, certain periods of history may be treated as objects enjoying a separate existence, such as the inter war period, 1919 1939, or certain communities may be made the object of study like urban communities, or again social institutions like property may be real objects, or phenomena like war or trade-cycle might be studied These objects may be said to have an independent existence because each of them can be subjected to a thorough treatment in their varied aspects, e g, the institution of property in its different aspects may be studied by different social sciences, such as economic history for its origin and evolution, law for its consequences, and psychology for the implications of the existence of property for behaviour For an exhaustive study of the subject one should learn about its different aspects which would mean that the student of property must know all the social sciences that are relevant to the subject However, a social scientist studying property cannot possibly

master so many branches of knowledge as each is in itself vast in scope and growing rapidly Instead, social scientists belonging to different fields can join together to study the various aspects, for co-operation, committees of experts in different social sciences must be formed to study war, or urban communities or the trade-cycle

Secondly, experts from different sciences can have seminars and discussions to throw light on all the aspects of the subject.

Thirdly, courses of lectures must be organised by different experts, and finally, different social scientists should be brought together through the appointment of lawyers to economic departments, psychologists to history departments and so forth By these means a certain measure of co-ordination of the social sciences may be achieved But for a programme such as these certain conditions may be essential The object of study must be modest and not too ambitious Secondly, experts working together must undertake intensive and prolonged study of the problem, to provide the incentive such work should be well-rewarded Thus, to improve the quality of research in social sciences a synthesis of deduction and induction and co-operation among social scientists are recommended by Prof Durbin

Economics and the Experimental Method

Prof Boulding discusses the scope of the experimental method in economic studies as compared with natural sciences[13] Social sciences cannot have the benefit of experiment as it is generally understood—an experiment being an event or a series of events, in which only the relevant elements are present and the irrelevant ones are eliminated or otherwise known. In chemical experiments the reaction of one chemical on another can be studied by removing the impurities of the chemicals or recognising their effect An experiment is under the control of the scientist In this sense, experiment in social sciences has a limited scope To some extent one might undertake experiments in social life, e g, to

[13] *Economic Analysis*, Kenneth E Boulding, Ch I, 1951

study the effect of milk diet on school children, different groups of children may be experimented upon. One group may be fed on milk while the other may not. Assuming that the two groups are identical in every other respect the better health of the group having milk may be attributed to milk diet, but in economic life experiments may be even more difficult. To determine the effect of a given rate of interest on businessmen, two groups may be subject to two rates of interest, one higher than the other. To study the reactions of business men to these rates of interest may be difficult as investors might respond in different ways to interest rates in the capital market because their conduct is governed by various factors such as their own state of mind i.e. whether they are optimistic or pessimistic, or the state of trade or business, that is, whether the business was prosperous or depressed. Hence by experiment one cannot determine the consequences of given causes in economic life. In the absence of the method of experiment Prof. Boulding recommends the statistical method as the nearest substitute for experiment. Although, as seen above, in economic life the conduct of people cannot be judged by means of experiment, it may be observed under *different circumstances* at *different times*. Any difference in their conduct under different sets of conditions may be attributed to differences in the conditions and thus we may infer tentatively the causal relationship. However, such causal relationships might not have any certainty about them but only a *high degree of probability*. For instance, one might study the relationship between demand and price in regard to sugar. A high price of sugar may be accompanied by low demand and a low price of sugar by high demand. From this one might suppose that when price was high, demand must be low. But this conclusion does not necessarily follow, since a high price might be accompanied by low demand and yet there may be little connection between the two. The low demand *might be correlated to high price* and may be the consequence of factors other than price such as money income, tastes, population-changes and availability of substitutes for sugar. At best, one can assume a probable relationship between the price and demand for sugar. This example brings out the difference between the experimental method and the

statistical method In the experimental method, the environment in which the event takes place is controlled inasmuch as only the relevant elements are present while the irrelevant elements are kept out In the statistical method diverse elements may be mixed up and these cannot be separated In a statistical study it is assumed that all the other conditions or factors remain constant, as for instance, all factors governing the demand for sugar excepting price are assumed to be constant in order to study the effect of price changes on the consumption of sugar Due to this fact that different elements may be playing their part, although they may be presumed to be constant, for purposes of analysis, in making generalisations, one cannot be dogmatic, i e, if two events were to follow each other the sequence does not necessarily imply a causal relationship between them. Prof Boulding recommends another near substitute for experiment, namely, the method of intellectual experiment Economic analysis aims at studying the relationships between different economic quantities Such quantities are highly complex In order to study them one has to postulate in one's mind, simpler systems, for instance, exchange economy is highly complex to understand so that before studying a money economy, one might study a barter economy Even so before studying society in its economic aspect, one might study an isolated economy This approach may be likened to the approach of pure mathematics in which one starts with simple propositions and proceeds to more complex ones In geometry we pass from one theorem to another "A straight line cuts two parallel straight lines at the same angle" leads to "the sum of the three angles of a triangle are equal to two right angles" Even so in economic analysis, we begin with simple assumptions and end up with more complex ones Owing to this fact most propositions in economics are hypothetical These hypothetical propositions are meant to simplify our study of the economic system In order to bring such a simplified system closer to life, we progressively introduce new elements into the picture, and yet economic theory built upon assumptions can hardly correspond to reality so that some economists such as Prof Durbin and Barbara Wootton regard economic theory as unrelated to economic life In defence of

this fact that economic theory cannot truly reflect economic life, Prof Harrod compares economic life to a geographical map which does not show every object like a tree or a house or a blade of grass in a landscape Even so economic theory cannot possibly cover each and every detail of economic behaviour Hence economic analysis cannot be a guide to a businessman or a banker in the conduct of their affairs, nor can the economist offer detailed advice to Statesmen but the advice of the economist is valuable as compared to others who are not equipped with economic analysis. He grasps the different economic implications in a situation and consequently his advice is worth having

The Scientific Method in economic studies J R Hicks

In essence economics uses in its investigations, the method common to all sciences [14] The primary objective of economics as of other sciences, is the study of facts to gain knowledge of various economic relationships In this process, the arrangement of facts is the most difficult part of its study as well as the most important. Facts by themselves can throw little light on economic life and therefore, have to be organised to have any significance To illustrate this point Hicks uses the analogy of a heap of stones which can no more be a building than a mass of facts be a science or knowledge Therefore, the existence and organisation of facts would presuppose their acquisition In the process of getting facts several methods may be employed One such method used to obtain facts about economic life is that of personal interviews In this, however, right information may not be forthcoming as the person interviewed might fail to answer questions asked, in a precise manner Therefore, this way of getting facts may be wanting in precision An improvement on the method of interview is the method of questionnaire Even then, there may be shortcomings in this method as all persons answering the questionnaire may not answer adequately Answers may vary from individual to individual Some may take the questions seriously and some may take them lightly But on the whole deficiencies of some may be made up by others so that in the

[14] *Social Framework*, J R Hicks Ch I, 1952

end the information may not be wholly useless, i e, to say, questionnaires may gain important data in spite of the defects inherent in the method This method is being used increasingly and the public, getting more and more used to questionnaires circulated by official and non financial bodies, is responding well to the attempts made to gain information The government, thus, submits income tax returns containing questionnaires on various aspects of a person's economic position Less frequently, the State collects census about population Taking advantage of the familiarity of the public with such official questionnaires, private organisations like universities and research bodies also, from time to time persuade the public to furnish information But this method being expensive, although more effective than the method of interviewing may be beyond the means of private bodies Hence, this device is often adopted to supplement other means of information Data may be collected for various purposes both officially and non-officially and published so that the economist may draw on these data Officially once in ten years the census of population is taken and reported which throws light on the size of the population, its composition the nature of occupations, the level of incomes, the size of families and the like Further, at different stages between any two censuses the State might gather facts about the population and publish them periodically Every quarter, the Registrar of Births and Deaths publishes data regarding population so that at regular intervals the various trends in population may be known To the economist the census is a mine of information on various questions Similarly the volume of imports and exports made known through official organs can also help the economist The budget is yet another source of useful information provided annually through the press In the sphere of industry, likewise, censuses of production may be taken regarding the number of workers in different industries wage rates mechanical equipment, volume of production etc Such censuses were taken in Britain in 1907, 1924, 1930, 1935 and 1948 The position of the industry is thus assessed periodically yielding useful material In addition to these sources one might get similar information from the publications of trade unions, once again giving wages employ-

ment, equipment and so on, business houses such as joint stock firms, banks and others are all in the habit of publishing balance sheets for the benefit of share holders which can be of value to the research worker Economic journals regularly publish information about transactions on the stock exchange, commodity prices, index numbers, etc From these various sources which are mainly unofficial, a wealth of information is available, all of which may not be relevant to the economist working on certain specific problems but some of it is sure to be of interest. Where he cannot obtain what he wants from these, he has to undertake investigations on his own account by means of interviews and questionnaires With the help of the information thus obtained the economist has to set about organising this information in order to interpret and arrive at conclusions and inferences One might distinguish four distinct phases or stages in this process which are not mutually independent but closely interrelated, i e, a problem under study or investigation involves four different stages in the process The first stage is represented by reasoning or theorising in the course of which the theorist poses questions to which he seeks answers from the information got The questions may be derived from various assumptions which form the basis for reasoning, i e, to make this acquisition of facts purposeful, the investigator must get those facts in the light of the questions raised If not, the facts themselves, may be unwieldy and cannot be properly used.

In the second stage, called economic statistics by Prof Hicks, the facts are sorted out, classified and used according to their relevance to the questions on hand This stage is called economic statistics not in the sense of facts and figures collected statistically but that the statistical information is so handled as to yield expected results

In the third stage, which is an extension of the second and therefore covered by what is called economic statistics to fill up gaps in the existing knowledge or data, the investigator may have to resort to conjecture or guess work Finally, in the last stage called applied or descriptive economics, solutions to the problems raised in the first stage are discovered and theories formulated on assumptions confirmed or disproved

A CRITICAL ESTIMATE OF VARIOUS DEFINITIONS

We shall discuss the critical estimate of Prof Fraser of the different definitions formulated since the time of classical eco nomists [15]

The various definitions found in economic literature may be put under two categories (i) That which connects economics with wealth or welfare and (ii) that which connects it with scarcity For the sake of convenience we shall call it wealth or welfare definitions *A* type definitions and scarcity definitions *B* type definitions Typical of *A* type definitions is the one given by J M. Keynes According to Keynes, 'Economics or political economy is the science which treats of the pheno mena, arising out of the economic activities of men in society " On analysis of this definition it is seen to contain the following elements The term science is ambiguous in general It may mean any systematic body of knowledge or more accurately a science may be a study attempting to build a body of knowledge The meaning of science may be limited in two ways (i) A science may be confined to the study of what is as opposed to what ought to be, (ii) the term may be applied to knowledge built up for its own sake as opposed to know ledge acquired for its practical usefulness The first limitation is based on the difference between a positive science and a normative science and the second on the difference between a pure or theoretical science and an applied science In the light of this a systematic body of knowledge studying what is and built up for its own sake may be called a science In the definition of Keynes, however, we might understand economics to mean a science concerned with the idea of what ought to be and a science aiming at practical utility The phrase economic activities' in the definition has a two-fold meaning (1) It may be interpreted to denote activities leading to an increase in wealth Hence the science of economics studies the acquisition and production of wealth (2) The phrase may refer to certain kinds of human behaviour, i e, that which would result in wealth Behaviour that does not lead to increase in wealth is not the subject matter of economics The phrase 'in society' in the definition raises further issues

[15] *Economic Thought and Language*, L. M Fraser, Ch II, 1947

regarding the scope of economics Whether it is limited to the study of Society or to simpler systems like isolated economies Other definitions, essentially on the same pattern, are those of Marshall, Adam Smith, Sidgewick, J B Clark, Nicholson and others Marshall's definition was that it "studies *mankind in the ordinary business of life and it was a* part of the study of man" To Adam Smith the subject of "political economy was the nature and causes of wealth of nations" Sidgewick, Clark and Nicholson regarded economics as the study of consumption, production, exchange and distribution of wealth The crucial word in all *A* type definitions is wealth—wealth in its economic sense connoting all material and exchangeable means of satisfying human needs. Therefore, economics treats of their production and appropriation Again economics may be a study of the economic system or the economy in the sense of the economic organisation, designed to produce and distribute wealth In another sense economics may be regarded not so much as a study of the *material means of satisfying wants but a study of the satis*factions themselves, because wealth ministers to social wellbeing or welfare From this point of view, the emphasis may be shifted from wealth to welfare so that economics may be described as the study of the welfare which wealth promotes Prof Cannan's definition is on these lines Economics has to do with the more material side of human happiness or material welfare The *A* type definitions suffer from two difficulties The first one arises from the association of economics with the materialist The definitions based upon the concept of wealth are in terms of material goods Even if the science is a study of the economic system, it suggests a mechanism meant to produce, transport and exchange concrete goods A distinction between the material and the immaterial may be made but the economist finds the distinction difficult to maintain The economist is concerned with things in so *far as they can satisfy human wants* But human wants may be satisfied in different ways One may be based on material means and the other on non material means for instance, *to tan one's skin one might expose oneself to the rays of the* sun or use an electrical apparatus giving out ultra violet rays The same want may be met in either of the two ways

so that when it is met by material goods, it would come within the scope of economics but if it is met otherwise it will be outside the scope of economics But since the want is satisfied either way the means of satisfying by the material or immaterial must be regarded as wealth In this case the time and trouble involved in sitting in the sun and the electrical apparatus are equally wealth Where to draw the line between the material and immaterial to define the scope of economics? Much of our activity meant to create wealth and, therefore welfare may be negative rather than positive In other words one might increase welfare not by reducing but by destroying things that are harmful for instance, by clearing weeds, the farmer increases his output and, therefore, enjoys greater wealth Can such activities which result in welfare be regarded as non-economic? Since they promote welfare without, however, adding to the stock of wealth, they are as much economic as activities which are positive in the sense that they produce goods Due to this difficulty economists have left the purely material sphere and conceive of production as the creation of utility which is immaterial and not so much the creation of material objects For the same reason economic theory today rejects the traditional distinction made between productive and unproductive labour Productive labour today is anything which might produce utility and value

In the face of these considerations the *A* type definitions have to be modified because they are not in harmony with the practice of economists One way of recasting the *A* type definitions is by redefining wealth so that it may be free from all material implications By so doing the scope of wealth will be widened to include the material as well as the immaterial Then wealth would cover concrete resources as well as time and energy all of which are useful and scarce in relation to wants Strictly speaking, wealth is understood to mean goods which are transferable but although our energies are not transferable they can, however, be hired out as one sells his labour to an employer Finally, economics is related to welfare instead of wealth Even then the criterion to judge welfare must be changed Welfare is not restricted to what is produced by material means but welfare in general which

can be measured in terms of money This will bring it in line with the conception of Prof Pigou, viz that *economic welfare is that which can be brought directly or indirectly into relationship with the measuring rod of money*

At the outset, it was pointed out that, generally, in the *A* type definitions there were certain defects Economics is associated with a certain department of human behaviour This would imply that human behaviour could be classified into economic behaviour and non-economic behaviour In other words, *from this point of view, people may be said to behave economically and non-economically* But to distinguish between what is economic and what is not is a difficult question, e g, a businessman say a stock broker may play a game of golf after his business hours Apparently, his business activity would fall into the economic category and his play into the non-economic because his activity in business yields an *income while his activity in play will not But the distinction breaks down on closer observation. It may be said* that the businessman might enjoy his work and again, his game of golf might contribute to his business efficiency and indirectly add to his income so that it is difficult to separate the effects of the two kinds of activity

Further, not only his playing golf but also his sleep, taking a holiday and relaxing otherwise might all promote his efficiency and thereby *increase his income Practically every* activity of the businessman may have a remote bearing on his ability to earn so that all his activities may be said to have an economic aspect. Therefore, it will be seen that a clear cut distinction between what is economic and what is non economic is hard to make One may, however, evade this conclusion by making a distinction in the scope of economics in principle and practice *Thus, in principle, economics may be* connected with different spheres of human behaviour, that is to say, different kinds of behaviour may be relevant to the production of wealth In practice, economics is concerned only with behaviour directly connected with the production of wealth Thus, the economist can study the principles governing stock exchanges or the organisation of an industry in some *detail while neglecting the psychological or physical*

effects of a game of golf or some other activity, only remotely concerned with economic life By taking this view, we may, however, admit that there is no precise boundary separating economics and other human studies i e, potentially, the economist must be interested in various aspects of human behaviour From the point of view of the *A* type definitions, economics, therefore, is closely allied to other social sciences and cannot be distinguished very clearly from them Again, to use the same example of the stock broker, suppose in order to enjoy leisure, he has to sacrifice some of his business and the income from it, assuming, for a moment, that his leisure spent in playing has no effect on his efficiency, but is enjoyed for its own sake The businessman will be faced with two alternatives viz., business or work and leisure, the former yielding an additional income and the latter yielding pleasure The former, therefore, is regarded as economic in character and the latter, as non-economic The alternatives between which he has to make a choice will involve the economising or the wasting of his resources his resources being in this case, time and energy If he makes a right choice between the alternatives and gains a larger measure of satisfaction he will be economising his resources and if he makes a wrong choice and gets a smaller measure of satisfaction he will be wasting his resources This is parallel to the alternatives open to a businessman When investing his capital, he might either invest it in improving his plant or in advertising Once again, the use of his capital may be right or wrong resulting in economy or waste The *A* type definition refuses to recognise the problem of the stock broker because the choice lies between work and play It would recognise only the problem of the manufacturer having a choice between improving his plant and advertising This is because in the case of the stock broker, the choice is between an alternative which will increase his income and an alternative which does not But, in the case of the businessman both alternatives may result in the increase of his income but one alternative may result in greater income than the other This would imply that, where choices are between the economic and the non-economic, the problem lies half inside and half outside the scope of economics This difficulty is treated differently by different economists Some

take it lightly, regarding choices between work and play, business, work or religion as problems of life as a whole and not of economics, solely. where the choice is between such alternatives, the problem of economising scarce resources to satisfy different ends is not relevant to economics Only choices within the sphere of industry or business involving different alternatives will be relevant to economics This is the stand taken by Prof Cannan On the other hand others have taken this question more seriously To them an economic problem exists whenever means are scarce and have to be economised. If choices relevant to economics were confined to business or industrial fields, the scope of economics will be restricted. The *A* type definitions by thus restricting the scope of the science, are found to be inadequate Hence a new definition with wider scope, covering all manner of choices, is found necessary This is the view of Prof Robbins

We may summarise the characteristics of the *A* type definitions First of all, in the light of these definitions, economics is associated with a particular department of human activity Secondly, *A* type definitions make no claim to a scientific status for economists admit that economics cannot strictly be distinguished from the other branches of knowledge, studying social life Finally, *A* type definitions make economics a positive science rather than a normative one, economics being positive in the sense that it studies economic life as it is and it does not study life as it ought to be This follows more or less from the fact that economics is not separated from other human studies Therefore, its field of investigation is not strictly what is directly relevant to economic life

Let us now pass on to the *B* type definitions which constitute the second main group The outstanding exponent of the *B* type of definition is Prof Robbins To his mind the central problem with which economic science is concerned is that of economy The question of economising arises from certain fundamental facts in economic life Ends are many and means

mic theory Hence the theoretical economist studies behaviour of people faced with multiplicity of ends and scarcity of means As a scientist the economist is not interested in the ends or means themselves In other words the nature of ends is not the concern of the economist even so the character of means that is the economist does not worry about the different aspects of ends such as the moral aspect or ethical aspect i e he is not interested in good ends alone Therefore, he may be said to be neutral as regards the character of the ends Again he is equally unconcerned about the nature of means satisfying ends Whether the means are material or im material he will be interested in them in so far as they could satisfy any end Other economists who follow a similar line of thinking are Prof Philip Wicksteed of England and Von Mises and Dr Strigl of Austria According to Prof Wicksteed 'Economics in its widest scope is a study of the general prin ciples of the administration of resources and of the ways in which waste arises in such administration'

According to Prof Mises the fundamental problem of economics is the disposal of resources or economising of resour ces This view is akin to that of Robbins Dr Strigl takes the same view of economic science and this has been translated in the following quotations from Prof Fraser s book *Econo mic Thought and Language* Chapter 2 Suppose 'that an indi vidual has control over a set of resources which can be devot ed to the fulfilment of various ends Suppose that the ends have been arranged in a scale of descending importance the question just arises how does this determine the ends to which the resources will in fact be devoted This is the question to which theoretical economists must find the answer The formula distribution of resources among given possible uses expresses the unifying principle of economic theory There fore once again due to these elements viz ends of varying importance and limited resources the problem of economis ing emerges Thus the central thesis of Dr Strigl is similar to that of the other *B* type definitions All these economists who adopt the *B* type definitions regard economics as a science a science in the sense of a system of theoretical and positive knowledge It is not merely a systematic body of knowledge i e economics is scientific not just because it has

been *systematised* but because *it is engaged in seeking truth for its own sake It does not discover truth for what it is worth in practical life* It seeks to know about reality or what actually exists rather than about what must exist When viewed from these angles, much of the work done by economists seems to digress from the abovementioned conditions necessary for economics to be scientific Very often, far from being pure or theoretical, it is applied in the sense that the knowledge of economics is employed in finding solutions to problems of business and industry Further, to that extent economics becomes inferior to other exact sciences which have a standard by which measurements are possible Again, by being normative, economics involves personal opinions of economists, opinions which are coloured by personal tastes and prejudices, but a true science must be neutral between the tastes and the prejudices of the exponents of the science In applied economics, which may be associated with economic policy, there is a great deal of scope for difference of opinion but in theory unanimity of opinion may be expected If economics were to be pure and positive from the point of view of the exponents of the Austrian schools of thought, i e deductive definitions, economics can be pure and positive by undertaking the study of the central theoretical problem of economy Only by dealing with the problem of economising scarce means to satisfy ends can economics be neutrally scientific in the sense of its being neutral between the personal opinions of different exponents of the science Thereby, it will also achieve greater precision and accuracy Therefore, the *B* type definitions are an improvement on the *A* type definitions which lack both accuracy and precision.

While the *A* type definitions classify human activities into separate departments, the *B* type lay stress on a certain aspect of human activities or behaviour, i e the aspect arising out of scarcity *Scarcity is present in all parts of our lives, i e not only in relation to industrial and commercial resources does scarcity exist but universally in relation to time, energy and* other immaterial resources Hence, being concerned with scarcity economics must be interested in phenomena involving scarcity From this point of view one might say that econo-

mics is universal in its scope The economist must, therefore, be concerned with the principles governing choice, consequently on multiplicity of ends and scarcity of means But, this view is criticised by some on the ground that, by considering scarcity as the criterion, one should have to include in the field of econmics all manner of problems which seem to lie well outside the realm of economics, as for instance, private problems of economising time and energy which seem to be irrelevant to the economist To study the *B* type definitions more thoroughly, one might examine the implications of such definitions under three different heads Firstly, the formal characteristics of the *B* type definition as a definition Secondly, the formal characteristics of an economic theory as defined by the *B* type definitions and thirdly, the content of economic theory so characterised Now, what are the characteristics of the *B* type definitions as a definition? In the first place the *B* type definitions differ essentially from the *A* type definitions which are formulated in terms of wealth or welfare The *A* type definitions approximate very nearly to the popular conception of the meaning of the word 'economic' However, the exponents of the *A* type definitions have given some precision to what the ordinary man considers to be economic

Secondly, the *A* type also conforms to the practice of the majority of economists both in the past and the present Due to the agreement between the economists' conception and the popular conception of what the word economics means, the *A* type definitions may be described as real and not verbal

Thirdly, the *A* type definition is positive and not normative in the sense that it attempts to explain what the economist stands for rather than what the economist wishes to understand by the term 'economic' and 'economics' Thus by not laying down what economists ought to study and by denoting what they in practice study, the *A* type is positive On the other hand, under the *B* type definitions the conception of the economist does not correspond with the conception of the layman In fact the formulation of the definition of economics based on the popular conception of economic and non-economic is liable to be unscientific For economics to be scientific, there must be a divergence between what is popular and

what is strictly economic, as understood by the student of economics. In other words, the popular usage and connotation of the term 'economics' may mislead the economist in developing a scientific definition. Economics as a science has a different significance from what it would have as loosely understood by the layman. As such, there is a verbal element in the *B* type definition which was notably absent in the *A* type. The supporters of the *B* type desire that an economist, as a true scientist, should confine himself to what Prof. Robbins called the 'Central economic problem' by eschewing all outlying fields of knowledge which have no direct bearing on the central economic problem because these branches of knowledge, such as psychology and ethics, are irrelevant to the central problem and are likely to divert the attention of the economist. This view propounded by Prof. Robbins is more or less shared by the other supporters of the *B* type definitions. By limiting the area of study of the economist, the *B* type definition tends to be normative in so far as it prescribes what ought to be the subject of study of a true economist. From this it follows that either the economist ought to be concerned only with distribution of scarce means among competing ends or that an economist is one who studies this problem. Further, an economist can claim to be an economist only while he studies the problem of economy and in so far as he studies it. This means that the moment he leaves the strictly economic problem, he ceases to be a true economist. For instance, supposing a professor of Economics undertakes in his leisure, inductive, practical research on the marketing of milk in an urban area. In the light of the *B* type definitions what is the status of the economist? Is he concerned with the irrelevant? Will he be considered a true economist only if he takes up problems of pricing as theoretical economic problems? It is hard to answer these questions, faced with the self-contradictions found in the stand taken by Prof. Robbins in his own book *the Nature and Significance of Economic Science*. Earlier at one place, Prof. Robbins protests against the economist's interest in the irrelevant disciplines other than what should strictly be the subject of the pricing process. In the same breath, later, he says that he did not intend to narrow down the speculative range of the economist

but only intended to ensure a greater accuracy in the mode of statement These two statements contradict each other Hence, it is difficult to pronounce judgements about a professor of economics studying the marketing of milk

In the light of the definition of a science par excellence the conception of economics according to the *B* type definition is characterised by the following qualities Economics is scientific it is positive, studying as it does what is and not normative in the sense of studying what ought to be Further, it is a pure science seeking knowledge for its own sake and not so much for its practical utility As such a divorce between theory and its application is possible in the realm of economics even as the study of physiology is distinct from the practice of medicine and of physics from engineering Economics is universal in scope and being scientific, it is neutral between the prejudices and tastes of different economists Regarding the status of economics as a science enjoying the above attributes economists hold different opinions Broadly, we may note three separate points of view First of all these points of view depend upon the temperament of different economist i e their attitude to the science To those economists who value abstract theoretical knowledge for its own sake, for the intellectual satisfaction which such knowledge gives to the student, economics as a pure and positive science occupies a place of honour among sciences

Secondly those who consider the practical side of economic science do not consider economics which is pure and positive as significant To them the significance of the science lies in its usefulness They regard economic analysis as a tool or means of economic policy The construction of the tool and its nature are of lesser importance Like doctors studying physiology not for its own sake but to fight disease, and navigators or sailors studying astronomy to steer vessels or ships in the right course these economists value economics not for the theoretical knowledge embodied in it but rather for its fruit bearing aspect that is it is as an applied science that economics rises in the estimation of these economists

Thirdly there are those who recognise the importance of theory as well as the application of economic science In that case they would not disapprove of the advisory capacity of the

economist since the utility of economics depends upon the relationship of economic theory to policy Thus, side by side, there are different points of view on this question of the nature and significance of economic theory The first school of thought is not necessarily superior to others i e the view that being pure and positive economics is truly scientific It is not accepted as noted above There are those who value economics more for what it is worth in practice than in the realm of abstract knowledge In the first of these opinions we meet with certain inherent difficulties i e if we treat economics as a *positive science, it should be free from all normative elements* How far can normative elements be excluded from economic theory? Economic theory consists of a body of universal judgements i e generalisations regarding economic life and behaviour Quite conceivably such judgements or generalisations may contain normative elements ; to that extent economic theory will be found wanting in view of the fact that it can be scientific only if it were positive, e g the Law of Equimarginal Utility is said to govern the distribution of resources in the most economical way 'Economical' here would *imply rational distribution of resources* The law takes for *granted that in distributing limited resources among competing* ends, people are rational but it does not imply by any means that people do act rationally or economically in satisfying their wants If they are irrational i e uneconomical, they satisfy less important wants at the expense of more important ones so that they do not maximise their satisfaction which a given set of resources can yield There is a normative implication in the Law of Equimarginal Utility when economical behaviour is identical with rational behaviour Economical behaviour is the right kind of behaviour *in as much as it maximises utility from given resources By misusing the resources i e, not* equalising marginal utilities from different wants the individual from an economic point of view, is acting wrongly Therefore, the conception of 'rational' behaviour being 'economical' behaviour implies that irrational behaviour will be uneconomical and therefore to employ resources to maximum advantage one should be rational in order to be economical, if not he would be uneconomical In such judgements the distinction between correct and incorrect economic behaviour cannot be

escaped Hence, normative elements creep into economic theory Further, in theorising and arguing the chain of argument or reasoning may contain elements that are normative in character e g one may arrive at certain conclusions from given premises Thus, the following argument may be taken to illustrate the presence of normative elements The best way of raising incomes is by raising productivity Technical improvements can raise productivity Trade unions want to improve the standards of life of their members by raising their incomes Hence, Trade Unions ought not to resist technical improvements In this conclusion or judgement based on the above chain of reasoning there is implied what Trade Unions must or must not do In other words, how should they choose between alternatives? Obviously, in making choices one should be rational i e, one should choose rightly or with the knowledge of what is good In this, therefore, the normative elements are very much in evidence Under these circumstances, if normative elements cannot be excluded, why should economic theory be positive in order to be scientific?

In our discussion regarding the *B* type definition, the third question involved is the content of economic theory In the light of the *B* type definitions, what are the economic problems that economic theory can cover? Obviously, if we accept the thesis contained in the *B* type definition economic theory should include the problem of distributing scarce means among competing ends and thus it leads to other problems of economic life which fall outside economic theory One of these problems over which there is controversy is the problem of welfare economics which covers welfare problems, welfare investigations and the like Can these problems be related to the question of the use of resources in satisfying ends? Prof Robbins thinks that welfare investigations are outside the scope of a truly scientific economist Prof Fraser disagrees with this view To him welfare economics is as scientific as pure economics, especially, economics of welfare as studied by Prof Pigou Prof Pigou in his work examines the relationship between the economic interests of individuals and those of the society of which they are members and he further examines how far the economic interests of individuals are consistent with those of society Can social welfare be promoted through

individual welfare? The theory of welfare economics is no less scientific than value economics Thus, according to the theory of value choices ought to be rationalised and according to the theory of welfare economic welfare ought to be maximised

Secondly, value theory examines the theoretical consequences flowing from rational choice The theory of welfare economics examines the theoretical conditions necessary for maximum welfare with given resources Further, in value theory one drawback is how to determine rational choices in welfare theory The corresponding difficulty is the determination of maximum welfare Thus, there is a parallelism between value economics and welfare economics Apparently, there is one point of difference between the two, in value theory sometimes the assumption is made that choices are rational but in welfare theory no assumption can be made that welfare in society is maximum Therefore, if welfare is not maximum, it ought to be maximised This would imply a normative judgement which is obvious In value theory by assumption choice is rational and consequently it is not necessary to say that it ought to be rational, but if we grant that choice is often irrational, then one should have to say that it ought to be rational—as a matter of fact people do make mistakes in choosing between alternatives Owing to the assumption of rational choice made by certain economists the normative element is not evident but concealed Thus, even here, on closer examination, the difference between the theory of value and the theory of welfare economics breaks down If, therefore, welfare economics and value economics have so much in common, it does not stand to reason that value theory should be treated as scientific and welfare theory as unscientific Therefore, if welfare economics can be scientific, there is no reason to exclude it from the content of economic theory

Summing up, the main features of the *B* type definitions are *that it intends to make economic science theoretical and positive* so that the content of economics does not agree with popular speech; rather, the content of economic theory is determined by what the science is expected to study The *B* type possesses precision and accuracy which are both absent in the *A* type With the *B* type one could readily decide whether

a given problem was economic or otherwise The *B* type is abstract being concerned with a certain aspect of human life as opposed to a department of economic life It is also abstract in the sense of being theoretical, positive and universal It is ambiguous It may be understood to prescribe formal rules which economists ought to follow in studying phenomena or it may be understood to denote merely what part of an economist's work is generally economic and what is not

Another issue closely related to the definition and scope of economics is the question of the applicability of economics Is it a purely social science concerned with phenomena in an individualist economy or can it cover other kinds of economy like the isolated economy or a communist society, a slave community or a medieval economy and so on? An individualist economy or community may be described as an economic order in which individuals have freedom of choice, in the sense of their being able to choose between commodities, and freedom of enterprise in the sense of their being able to choose between occupations Such economies which are identical with capitalist states of the past and present are based on the mechanism of price which harmonises the decisions of individuals as producers and consumers and, thereby governs the distribution of resources among various ends It is the pricing system which brings about an equilibrium between total demand and total supply When supply is abundant, price falls and expands demand to bring it into level with the existing supply, similarly, in the labour market where labour is scarce wages rise and attract more labour into the occupations Again when the supply of a good or commodity is scarce the rise in price causes a contraction in demand, adjusting the demand to the supply In overstaffed occupations wages tend to be low thereby discouraging fresh entrants Thus the price mechanism is the fundamental basis of an individualist economy In that case if economics is a study of individualist economy it should necessarily mean that it is a study of price mechanism or the study of production and consumption of wealth under the control of prices However, one may treat this view as a third definition of economics distinct from the *A* and the *B* types or one may treat it as just a variant of either types, a form of the *A* type and the

B type definitions In the latter case, *i e* treating it as a variant of *A* or *B* if it is included under *A*, we may define economics as a study of production and distribution of wealth in an individualist economy If we include it under the *B* type, it would be described as a study of the distribution of scarce means or resources among competing ends in an individualist economy What are the issues between those who limit the science to individualist economies and those who regard economics as applicable to economies other than individualistic economies? One may approach the question from two angles Firstly, is any useful purpose served if the economist goes beyond individualist economy, i.e will the community or society benefit by such wider studies of the economist by throwing light on practical problems?

Secondly, is it beneficial to the economist himself? Will he be able to understand problems of a price economy or an individualist economy better by enlarging the field of his investigations? The answers to these questions may be given below

There is a common economic problem in all economic systems, individualist and others viz. of economising scarce resources The problem of economy in the context of freedom of choice and of enterprise and the mechanism of price lends itself to an elaborate scientific treatment In other systems like the Crusoe economy and a communist society choice is simpler being based on one individual, the isolated individual in the isolated economy, and the economic dictator in a planned economy, so that the distribution of resources is comparatively easier and simpler than in a capitalist society

In the capitalist economy where choice is decentralised so that individuals as producers and consumers make economic decisions, choice becomes complex and the interactions of individual choices become complex so that they constitute a fit subject for formal scientific treatment by economists Further, although economic analysis may have maximum relevance under the price system, the study of other kinds of economy, especially the isolated economy, may be useful for illustrative purposes The study of the isolated economy may form a prelude to the study of an exchange economy under a price mechanism As regards the question whether the economist

stands to gain in learning about the organisation and working of a price system by first learning about simpler economies like a Crusoe economy, it raises a controversy Some economists believe that as a preliminary step to the study of the price system the study of an isolated individual will be helpful This is the opinion of Prof Cannan Gustav Cassel, on the other hand, holds that such simple analysis preceding a more complex analysis can serve no purpose We might say, therefore that the method of approach is a matter of individual temperament Some prefer to proceed from the simple to the more complex, from an isolated economy to an exchange economy or from a barter to a money economy Others like the direct method and take up the complex system without studying first a simpler system

Another question that arises is whether an analysis of economies other than individualist economies forms a part of economic theory or does it lie outside it? This is a verbal matter Sometimes a distinction is made between the broader field of theoretical economics and the narrower field of price economics or the study of prices under capitalism If we choose to call the entire realm of economic studies by the name economic theory, the study of the price system may be called the science of prices Then in the broader field of theoretical economics we should include not only the individualist exchange economy but also other economies Thus, even choices made outside the price system may be studied by the theoretical economist

PART TWO

THE THEORY OF CONSUMPTION

more, he can invest in different assets Thus, these decisions are all interdependent They are dependent on each other and act and react on each other Private decisions are difficult to predict because one cannot forecast how an individual would behave Economic decisions imply, further, that at a given time there is a fixed total, for instance, a fixed income to be spent or saved However, over a period of time, the total may vary Thus incomes may increase enabling earners to spend or save more A second implication of economic decisions, whether private or business, is that they involve deliberation i e careful reflection about different alternatives Normally, private decisions may also be irrational They may be impulsive or the result of habit Consequently, private decisions are not amenable to prediction However, they have economic significance and affect economic life Decisions to spend more or save more would affect the supply of goods and capital Such decisions are reflected in the prices of commodities in the market and the rate of interest Affecting as they do economic life, they have economic significance When, however private decisions do not affect economic life, they are merely choices without any economic significance For example, in which direction to take a walk is a choice between alternatives without any economic importance But, if one should choose to go to a theatre rather than take a walk, his choice will affect economic life as there is a greater demand for theatre tickets If a doctor chooses to work in his clinic instead of taking more leisure, his income will increase and hence his decision has an economic significance In a sense economic decisions of private individuals are to be judged by their effect on economic life and such effects are measured in terms of money For example, the decision to visit the theatre will increase the income of the theatre-owner Even so, the decision to work longer hours will increase the income of the doctor As against private decisions in economic life, there are business decisions, made by business firms These relate to alternatives open to businessmen where to produce, what methods to employ, how to allocate resources and the rest. Once again, such decisions would imply limited resources and deliberate choice Compared to private decisions, business decisions are easier to predict assuming that businessmen

generally aim at maximising profits under given conditions Only certain alternatives can maximise profits so that studying objective conditions under which a firm operates, one might venture to forecast what decision the firm would make, and yet, even then, such predictions may be falsified due to the subjective element Even in business decisions, very often, the conduct of businessmen is coloured by their prejudices and outlook They may be pessimistic or optimistic, timid or venturesome But, businessmen seeking maximum profits may be expected to act in certain ways Their decisions, therefore, are governed by external conditions and circumstances while decisions of private individuals, subject much more to impulse and emotion, custom and convention, are more arbitrary The community at large is again faced with different alternatives, in using its resources It has to decide whether to produce for the present or the future Thus, choice as an economic decision is involved at different levels in the economy But, choices made by individuals or firms or the community all involve alternative ends against limited means, entailing economy

II CONSUMER'S SOVEREIGNTY

Next, we must examine the concept of Consumer's Sovereignty or the sovereignty of the consumer under capitalism because it is under capitalism[2] that the institution of freedom of choice exists unrestricted Consumers in a capitalist society enjoy liberty in the matter of consumption They can dispose of their income as they please, complying, however, with the law of the State The consumer can spend or save or hoard or invest or give away in charity his money or income and yet the freedom of the consumer is not unqualified The freedom of the consumer is limited in many ways An inherent limitation may be due to the very size of his income A low income would confer limited powers of consumption. The State again may come in his way so that limitations of various kinds might reduce one's freedom of choice But, allowing for such limitations, 'the consumer,' it is said, 'is king under capitalism' In what sense does he enjoy freedom in the consumption of wealth?

[2] *Ibid*

Any economic society, capitalist or socialist, that is, un planned or planned seeks to dispose of resources with a view to produce goods and satisfy wants In a capitalist economy the disposal of resources is governed by the consumer's choice In such a society, wherein the mechanism of price operates in the market production of wealth and its consumption are both determined through the market mechanism Producers aim at maximum profits and consumers at maximum satisfaction of wants The interests of both producers and consumers are interdependent. Producers produce goods for which demand exists and thereby earn profits The demand for goods is reflected in the behaviour of prices in the market Prices are an index of consumers' preferences Therefore, producers are guided by prices in discovering what the consumers want It is in their interest to produce those goods for which there is demand in the market Through the medium of prices, producers and consumers seek to achieve their aims

The close connection between consumers' interest and producers' interest would be more evident if producers and con sumers were in direct contact that is to say, if production were based on the orders of the consumers rather than if production were in anticipation of demand If demand were to precede production and supply of goods, consumers would first place orders with retailers, the retailers in their turn, would place orders with the wholesalers and the wholesalers with the producers and so on However, under modern conditions with territorial division of labour, international trade, and world markets, production is in anticipation of demand But, the basic fact is not altered in asmuch as producers act on their anticipation of consu mers' demands If their expectations should be correct they gain Otherwise, they lose and bring their plans of production more into line with consumers' needs Thus, it is observed that production in the modern world is controlled by demand or anticipated demand Under capitalism it is governed by the individual choice of consumers and therefore the valuation of consumers while in a planned system or in an economic dictatorship, it is governed by the choice of the planning authority or the economic dictator and hence by the valuation of the dictator

Thus, the consumer in a capitalist society is powerful and determines how resources are to be employed, i e what goods are to be produced Nevertheless, he is subject to various restrictions in exercising this power The scarcity of resources restricts both the size and the composition of goods, i e the use of resources involves choice between alternatives and opportunity costs or the production of certain goods will involve the lack of others The purchasing power of the consumer, together with the scarcity of resources, limits the range of goods which he could consume The limited purchasing power of the consumer hinders the consumer from exercising this freedom of choice The state of technical knowledge at any given time further imposes limitations on the satisfaction of consumers With a given state of technology or knowledge the consumer must be content with whatever goods are produced In other words, he cannot aspire to have improved goods without an improvement in knowledge The consumer's wish for noiseless trains may be unfulfilled since technology is not sufficiently advanced to provide them However, the existence of a desire for noiseless trains may cause the invention of such trains so that, eventually, such a limitation on consumers' choice may be removed Frequently, the State, in the interests of the public, may curb the liberty of the consumer Sale of goods such as noxious drugs, injurious to public health, like opium, may be restricted or the production and sale of alcoholic drinks may be prohibited, and to curtail the use of tobacco, it is taxed so that the freedom of the individual in buying and using commodities is limited Taxation of income further reduces purchasing power and therefore, freedom of consumption.

The existence of monopoly constitutes yet another limitation on consumers' sovereignty Under competition the consumer enjoys extensive choice among producers while under monopoly there is little or no choice The consumer is at the mercy of the monopolist. The monopolist controls the supply and price of the article so that the consumer suffers due to the high price charged by monopolists, the purchasing power of the consumer is lessened and secondly, a high price of the monopolist presupposes a limited supply Hence, consumers in general may have less to buy at high prices

Monopoly may exist not only in consumers' goods but also in intermediate products and producers' goods If monopoly exists in intermediate products or producers' goods, the choice of manufacturers using such producer's goods is restricted and consequently the supply of finished commodities available to the consumers is thereby limited Monopoly, at whatever stage in the process of production affects in the long run, freedom of choice of consumers Monopoly may exist even with regard to labour so that the supply of labour is controlled by powerful trade unions and therefore wages may become uneconomic from the point of view of manufacturers producing goods who use such labour

Modern methods of advertisement and high pressure salesmanship influence consumers and buyers in purchasing commodities The judgement of consumers is to that extent not free It is constantly subject to advertisements of different manufacturers In a sense, therefore, the consumer, in choosing between goods, is affected by the effectiveness of the advertisement of a producer much more than his unbiased discretion This view may be refuted by pointing out that advertisements are universal Every producer producing a brand advertises his wares The buyer is influenced equally by different brands of different manufacturers He must, choose between different alternative brands or articles so that he does use his judgement Further standardised production, characteristic of modern production of goods, makes for standardised products The individual taste of a consumer is not catered for To that extent in so far as the consumer has to buy what is offered and has no choice in the matter, his freedom of choice may be said to be restricted But, in another sense, this very standardisation of production has led to cheap goods which have released purchasing power which the consumer could use to buy more goods and enjoy a higher standard of living However under capitalism the consumer enjoys a greater measure of liberty compared to his counterpart under a planned economy In the light of this, one should say, that even under capitalism the consumer does not have absolute and unrestricted freedom of choice, but only limited freedom of choice.

Desirability of Consumer's Sovereignty

How far is freedom of choice conducive to the interests of the individual himself, and to the interests of society at large? Different opinions have been expressed on this matter In his book *Economic Analysis and Policy*, while discussing some of the disadvantages of perfect competition Prof. Meade considers, incidentally, this aspect of consumer's sovereignty[3] Under perfect competition, is the distribution of resources perfect? If not, why not? One reason why factors of production may not be employed to the maximum advantage may be because consumers fail to distribute their incomes among different goods properly Consumers' choices, in other words, are far from perfect. Consequently, the use of resources which is based on consumers' choice must be imperfect. Although consumers have the liberty to consume as they like, at times they may be ignorant of the right choice They need guidance either from the State or some other body. For example, a sick man cannot choose the drug for himself and, as such, he needs the assistance of a medical authority who has knowledge of drugs In this case it is obvious that the sickman would gain by seeking the advice of a doctor However it may happen that the consumer imagines what is best for him while, as a matter of fact, he may be doing harm to himself by his conduct. In these circumstances, freedom of choice must be curbed The patient might underestimate the seriousness of his own malady and neglect his health Further, an individual might be careless about the future and fail to provide against a possible contingency In other words, he might not save against possible illness in future Therefore, generally, if people are given to spending not enough on medical services or not saving for the future, there is clear case for the State to intervene, either by subsidising medical services or forcing compulsory health insurance on the public Similarly, the layman might not appreciate the importance of general education while the public authority may have a keener appreciation of the importance of compulsory education If the citizen fails to educate his children, the State must make him do so Again, the average

[3] *Economic Analysis And Policy* J E. Meade Part 2 Ch 3, 1950

individual might overestimate the advantage of a good, such as a drug Then the State is justified in limiting or prohibiting its consumption When the individual fails either positively or negatively to make right decisions, government interference by means of taxes prohibition, rationing, licensing and subsidising will become necessary A more effective way and one which would minimise such interference in consumption by the State is to reduce the ignorance of the consumer where it is possible For example, a consumer may be ignorant of the effects of using pasteurised milk There may be misconceptions regarding pasteurisation Some may think that pasteurisation gives immunity against T B Others may think that it would take away immunity against rickets The public might be in the dark as regards the real effect produced by pasteurisation In deciding the question it would be best to put it before expert opinion and act upon the verdict given This shows that in technical matters the individual by himself cannot possibly make the right choice In our example he cannot decide whether he may drink pasteurised milk or he may not But otherwise, where the individual can depend on his commonsense, it would not be proper to come in his way when he makes choices

Another writer, Barbara Wootton[4], has argued against this institution of freedom of choice In the modern world, characterised by extensive competition in industry and trade, the consumer is faced with a bewildering variety of commodities which are substitutes Consequently, one may not be able to choose from such a range of goods She further argues against free consumption as most consumers lack even the minimum knowledge necessary for enlightened choice She cites the example of a purchaser of jams Since the average puchaser may fail to discriminate between the commodity made of fruit and synthetic materials the choice between different varieties of jam may often prove to be wrong Again the consumer of textile goods may fail to see the difference between the material which is genuine and can last long and that which is apparently good Under these circumstances one may rightly choose if he had at least enough knowledge of commodities Normally, an individual can at best choose

[4] *Lament For Economics* Barbara Wootton Ch 5 1938

correctly, a few goods A book lover may be said to possess discrimination in the matter of books In regard to other goods, he may prove to be a poor judge It may be said that in order to make the right choice, one should learn through experience, and experience should inevitably involve mistakes and errors of judgement. To this Wootton replies that this would be an expensive way of learning In the process of learning one might injure oneself and, further, when consumers excercise their choices wrongly, it would lead to the wrong distribution of resources The individual as well as the community might learn to make correct choices at the expense of their welfare How much better it would be, if mistakes were pointed out and detected instead of paying such a price For instance, a man may suffer by using a certain kind of food Although the suffering may be clearly attributed to the food, he would not know where exactly the fault lay Prof Benham is of the view that the desirability of consumer's sovereignty or otherwise is a question which lies outside the scope of economics But others, socialists and exponents of planning in economic life, regard this issue as of paramount importance because, generally speaking, consumers are poor choosers They lack discrimination. Curiously enough, they prefer ugly things to beautiful ones, harmful goods to beneficial ones, and display an amazing lack of good taste in the arts like literature, music and the rest. Sometimes, they deliberately misuse their money, spending, for example, on drink instead of wholesome food Should not the consumer be guided and even forced to take what is of value and benefit to him?

There is one school of thought which holds that in matters of tastes with regard to consumption of commodities, there must be freedom to the consumer The reason that is given for this is, unless the people have the chance to make choices how could they learn? Making choices might involve them in errors and mistakes, but such errors should be considered as a necessary evil and therefore inevitable But this is refuted on the ground that by merely making mistakes in the process of choosing commodities one may not learn anything because one may not know where the mistake lies What is the justification for allowing people to make mistakes? Unless there is

some knowledge, technical or otherwise, one may continue to make mistakes without learning much There are further im plications in consumer's sovereignty While granting this freedom, it appears that the consumer is presumed to know best how to choose Nobody else knows as well as the consumer what is good for him It further means that although the con sumer may make a wrong choice, the satisfaction he gets from his freedom of choosing far outweighs the dissatisfaction due to the wrong choice Again, it implies that freedom of choice is a necessary condition in a capitalist system for the distribution of resources This idea is contained in the phrase "Ballot of the market place' used by Prof Mises It would imply that under freedom of choice the consumer determines, through his expenditure, the allocation of resources Each time the consumer buys an article, it is like voting in favour of the supply and production of that article However, the concept itself has a philosophical aspect, i e what is the value which the consumer attaches to freedom of choice compared to the value he would attach to the utility of the commodity? Would the consumer prefer this freedom which might entail the consumption of the wrong commodity or the satisfaction gained from the right commodity forced on him which would be at the expense of his liberty to choose? What would be the satisfaction that one might gain from poisoning oneself compared to the satisfaction from good food given to him without consulting his wishes? This question is unanswerable as it involves subjective judgements The value attached to freedom of choice might vary from individual to individual so that X may prefer to choose for himself even the wrong commodity while Y might prefer the right commodity imposed on him at the cost of his liberty to choose Another argu ment against consumer's sovereignty is based on the distinction between desire and effective demand Only when demand is effective it has economic significance, as such a demand would actively affect supply and thereby the allocation of resources Effective demand depends upon purchasing power and one who has a larger measure of purchasing power will affect the supply and use of resources more than one who has a smaller measure of it One with Rs 2 000/ will exercise ten times as much influence on the market as one with Rs 200/.

Since, under capitalism based on private property, freedom of enterprise, free competition and freedom of choice, inequality of income is inevitable, only by reducing such an inequality can purchasing power be more evenly distributed and with it the freedom of choice Otherwise, only those with money can excercise such a freedom of choice, while the poor may possess little or no freedom of choice In order to confer in a real sense such a freedom on society, the demand of everybody must be effective This could be done by distributing wealth more equally Consumer's sovereignty is further affected by such factors as custom and convention impulse and emotion, so that very seldom it is used with advantage or after due deliberation In short, consumer's sovereignty is often misused in so far as choice is irrational. Thus consumer's choice tends to be imperfect and the desirability of this institution is questionable

Consumer's Sovereignty and Social Welfare

Apart from these minor and less important aspects, the institution of consumer's sovereignty raises some fundamental issues Freedom of choice is expressed in the concept of consumer's sovereignty in a capitalist society and it is basic to capitalism Socialists attack this institution on the ground that it fails to bring about the right utilisation of resources To an extent, inequality in income may be narrowed down through taxation or otherwise The existence of private property in means of production causes once again accumulation of income in the hands of property-owners so that the gap between the income of the rich and the poor or those owning property and those lacking property will tend to become wider Unless, private property is abolished by the State and means of production are owned or controlled by the State, consumer's sovereignty will be confined to the wealthy This is unfair to the majority in the community If the State could use the means of production in the interests of society and not for profit, as is done under capitalism, then generally, a large measure of consumer's sovereignty could be enjoyed by one and all But a socialist society based on public property in means of production and economic planning might result

in the disappearance of the very institution of freedom of choice, i e as production as well as consumption will be regimented nobody would really enjoy freedom of choice But if the sacrifice of such a freedom along with the sacrifice of other freedoms under capitalism, such as freedom of enterprise and competition, could promote the welfare of society, the sacrifice of the freedom of choice could be considered as well worthwhile This seems to be the opinion of Dr Maurice Dobb If, economic welfare or its absence in society depended upon the desirability or otherwise of freedom of choice, the question of consumer's sovereignty, far from being outside the scope of economics, has an intimate bearing on the studies of the economist In the real world, the economist, seeing the glaring contrast between the rich and the poor, must undertake the redistribution of income, and the redistribution of income, through socialisation, would involve the question of consumer's sovereignty and hence consumer's sovereignty is very much within the domain of the problems of economists

III INDIFFERENCE CURVES

To explain the method of Indifference Curves we shall use illustrations, first under a system of barter and later under a money economy We shall take a hypothetical example under barter Let us suppose that a regiment of soldiers is stationed in an out of the way place [5] Each member of the regiment is allowed a fixed ration of two commodities, cigarettes and rum Further, suppose different soldiers have different scales of preferences or tastes Thus some may have a preference for rum and others a preference for cigarettes On these assumptions, let us consider the case of a soldier, *A* Soldier *A*, to start with, gets 10 tots of rum and 50 cigarettes Further, *A* has a partiality for cigarettes To get more cigarettes he will exchange rum for cigarettes with another soldier, *B* who has a partiality for rum Suppose the soldier *A* is willing to exchange one tot of rum for 4 cigarettes, then, out of his ten tots, he will be left with 9 tots and to his fifty cigarettes he will add 4 cigarettes Therefore, he will have a second com-

[5] *Economics*, F. Benham, 1948

bination of cigarettes and rum, 9 tots of rum and 54 cigarettes The significance of these two combinations lies in the fact that *A* will be indifferent as between the two combinations or the two combinations are of equal value or both are equally attractive to him. Suppose *A* gives up a second tot of rum to obtain more cigarettes. For the second tot thus given up, suppose he demands 6 cigarettes. He will have a third combination of 8 tots of rum and 60 cigarettes Similarly, he will have a fourth combination of 7 tots and 70 cigarettes Working upwards he will have

13 tots	and	44 cigarettes
12 tots	and	45 cigarettes
11 to s	and	47 cigarettes
10 tots	and	50 cigarettes

which is his ration with which he begins We may reduce these combinations to a table or schedule Thus we have

13 tots of rum and 44 cigarettes
12 tots of rum and 45 cigarettes
11 tots of rum and 47 cigarettes
10 tots of rum and 50 cigarettes
9 tots of rum and 54 cigarettes
8 tots of rum and 60 cigarettes
7 tots of rum and 70 cigarettes

Indifference Schedule

This is the schedule of the soldier A showing the various combinations of the two commodities, rum and cigarettes, as between which he is indifferent. In other words, if offered any two of the combinations, he cannot express any preference for one or the other These combinations we may represent on a two dimensional figure (Fig 1) Each point on the Indifference Curve shows a combination of the commodities Just as in the Indifference schedule or table the different combinations are of equal value so that the soldier is indifferent between them, so also on the Indifference Curve, different points representing different combinations are of equal value, i e the soldier will get the same satisfaction wherever he is on the curve

Indifference Curves and Map

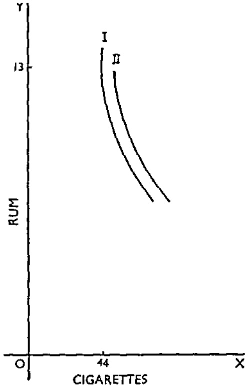


Figure 1

Suppose we begin with a new combination of cigarettes and rum—say 11 tots of rum and 55 cigarettes If we look at our old schedule, we find that we have 11 tots and 47 cigarettes Obviously, this new combination is better than the other Therefore, the new combination will be preferred But the other will be as good as 10 tots and 50 cigarettes The soldier *A* will be indifferent between these two combinations The new combination, 11 tots plus 55 cigarettes, will, how ever give a larger amount of satisfaction It is better than any other combination How can we draw this curve?

We can draw a 2nd curve which lies to the right of Indiffer

ence Curve I This would be called the Indifference Map of the soldier

The significant point we should note here is, as we have seen, the 2nd curve is based on 11 tots plus 55 cigarettes combination which is better than any combination on the old curve

The combinations of the two commodities shown by different points on Indifference Curve I are of equal value to the soldier Thus the soldier will be indifferent between the 11 tots of rum and 47 cigarettes and 10 tots of rum and 50 cigarettes But the combination 11 tots of rum and 55 cigarettes is obviously preferable to the combination 11 tots plus 47 cigarettes Therefore, it follows that the combination—11 tots and 55 cigarettes is preferable to 10 tots and 50 cigarettes Similarly, 11 tots and 55 cigarettes will be preferred to all other combinations on the first Indifference Curve and the combination 11 tots and 55 cigarettes is represented by a point plotted to the right of the first Indifference Curve On the basis of the combination 11 tots plus 55 cigarettes we may again obtain an Indifference Schedule showing the combinations of rum and cigarettes, which are of equal value or as between which the soldier is indifferent Therefore, all combinations on the second Indifference Curve will be of equal value Even so, all combinations on the first Indifference Curve will be of equal value But the combination 11 tots and 55 cigarettes on the second Indifference Curve gives more satisfaction than the combination 11 tots and 47 cigarettes, on the first Indifference Curve Therefore, the combination 11 tots and 55 cigarettes can give greater satisfaction than any combination on the first Indifference Curve Thus when there are two Indifference Curves (I and II) combinations on one Indifference Curve will be of equal value and similarly combinations on the second Indifference Curve will be of equal value But combinations on the higher Indifference Curve will have greater value than combinations on the lower Indifference Curve Each curve is an Indifference Map represents one level of satisfaction The higher the Indifference Curve or the farther it is from the origin O, the higher the level of satisfaction from the combinations of two commodities If, therefore, the consumer, or the soldier in this example, can

move from a lower Indifference Curve to a higher Indifference Curve with a given income—here the fixed rations of rum and cigarettes—and a rate of exchange between rum and cigarettes, he would do so

The conclusion of this is very important A consumer with a given income and a rate of exchange will attempt to move from a lower Indifference Curve to a higher Indiffer ence Curve

Going back to soldier A his income in the form of his weekly ration is 10 tots of rum and 50 cigarettes Suppose the rate of exchange between the soldiers in the regiment is 1 tot=10 cigarettes and vice versa Looking back at the sche dule of our soldier, we find that one of the combinations in the schedule is 8 tots of rum and 60 cigarettes The initial ration of our soldier is 10 tots of rum and 50 cigarettes He began with this income At the rate of exchange, 1 tot of rum=10 cigarettes, suppose soldier A gives up 2 tots He is left with 8 tots and in exchange for the two tots he can obtain 20 cigarettes He will have 8 tots of rum and 70 ciga rettes In the table, the soldier is indifferent between 10 tots of rum and 50 cigarettes and 8 tots of rum and 60 cigarettes But obviously 8 tots of rum and 70 cigarettes is better than 8 tots of rum and 60 cigarettes Therefore 8 tots and 70 cigarettes is better than 10 tots and 50 cigarettes

This combination of 8 tots of rum and 70 cigarettes will yield a large amount of satisfaction than 10 tots of rum and 50 cigarettes In terms of geometry in an Indifference Map showing a series of curves one above the other, it would mean that the combination 8 tots of rum and 70 cigarettes is better than either of the two combinations and will be to the right of the previous curve, i e it will be above the previous curve Therefore, if the soldier A can by ex change of his rum for cigarettes, get a better combination, he would be on a higher Indifference Curve or one which is farther away from the origin O We shall show this in the form of a diagram (Fig 2)

At the rate of 1 tot=10 cigarettes, suppose A exchanges all his rum, i e 10 tots If he exchanges his 10 tots, he would get 100 cigarettes Thus to start with he had 10 tots of rum and 50 cigarettes Suppose he exchanges all his rum for

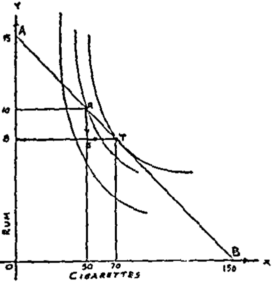


Figure 2

cigarettes, he will get 100 cigarettes Then he will have 50 plus 100 cigarettes=150 cigarettes That is one possibility The second possibility is that he might keep his 10 tots of rum and exchange all his cigarettes for rum which will give him 10 plus 5=15 tots Thus, there are two possibilities, one, his exchanging all his rum for cigarettes whereby he would obtain 150 cigarettes and two, exchanging all his cigarettes for rum in which case he will have 15 tots There are other possibilities also and that would be to exchange only a part of his rum and obtain cigarettes or give up some of his cigarettes and obtain rum Thus he might have various combinations of the two commodities

Our consumer starts with a given combination This may be represented on a line *AB* Point *R* would be the initial ration of *A* which is 10 tots of rum plus 50 cigarettes But if *A* gives up 2 tots of rum he would get 20 cigarettes so that he will have a combination of 8 tots and 70 cigarettes This is better than 10 tots and 50 cigarettes In geometrical

language this will be on a curve higher up than 10 tots and 50 cigarettes That means the point R on AB must be on one indifference curve while the combination 8 tots and 70 cigarettes must be on a higher indifference curve In order to get 8 tots and 70 cigarettes represented by point T the consumer will have to move down from R to T by giving up 2 tots and getting 20 more cigarettes, i e to obtain the new combination 8 tots and 70 cigarettes he must give up RS of rum to get ST of cigarettes

The point R denoting the initial ration of our soldier should lie on an Indifference Curve which is below the one on which point T is There are a number of Indifference Curves, one of them touching the Consumption Possibility Line at a point T others above the Consumption Possibility Line (*CPL*) and below *CPL* Our consumer with a given ration would try to reach the highest curve he can Starting from R, he can get maximum satisfaction at T At T he has got the best possible *combination of the two commodities* When the consumer has got limited income, under the limitations of a fixed income, he can reach only a certain curve and if he wants to get up higher, it would be possible only if his income increases or the prices come down

By superimposing the Indifference Map of Consumer A, we will be able to determine the equilibrium position of our con sumer with a given income and rate of exchange

Case of Soldier B

Like soldier A, soldier B starts with this quantity of 10 tots and 50 cigarettes but unlike A B prefers rum to cigarettes i e he wishes to exchange cigarettes for rum As in the case of A we can work out various combinations of B and get the indifference schedule and indifference may of B

150 cigarettes	and	7 tots
100		8
70		9
50		10 initial ration
33		11
23		12
15		13

This indifference schedule shows different combinations between which B is indifferent. Suppose the rate of exchange is fixed say at 1 tot–10 cigarettes, as before Since B has a preference for rum, he would exchange his cigarettes for rum to get more rum Let us say he gives 20 cigarettes and gets 2 tots of rum Thus he has 10 tots of rum and 50 cigarettes to start with and he gives up 20 cigarettes and gets 2 tots so that he will have a combination of 12 tots of rum and 30 cigarettes Our soldier is indifferent between 10 tots of rum and 50 cigarettes and 12 tots of rum and 23 cigarettes But 12 tots of rum and 30 cigarettes is better than 12 tots of rum and 23 cigarettes Therefore, this will be on a higher indifference curve and he will move up to a higher Indifference Curve by exchange 20 cigarettes against 2 tots of rum Once again we might represent the position of soldier B in a diagram (Fig 3)

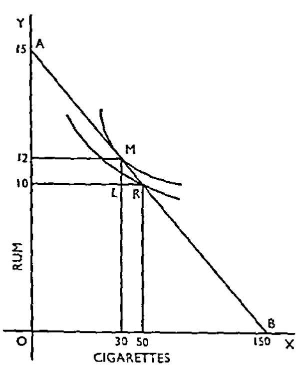


Figure 3

Again we combine the indifference map of soldier B with the $CPL—AB$, we superimpose the indifference map of B over the diagram $CPL—AB$ and by doing this we find that after B attains equilibrium or gets the best combination by having 12 tots and 30 cigarettes he will be at point M on the highest indifference curve that he can reach He is at first at R—his initial ration, and he can reach the highest Indifference Curve by moving from R to M and since this is the best possible position he can reach the curve will be tangential to line AB The Indifference Curve on which B has the best combination, 12 tots and 30 cigarettes, will be a tangent to the $CPL—AB$ at point M In other words, by giving up RL cigarettes, or 20 cigarettes and getting LM rums or 2 tots, B gets a better combination of the two commodities than he had before Curves either below or above the one which is tangential to the line AB are ruled out In other words our consumer B has attained equilibrium by being on the indifference curve which is tangential to AB

Let us analyse the case of A and the case of B Both of them begin with 10 tots and 50 cigarettes Beginning with this combination, A by giving up 2 tots of rum in exchange for 20 cigarettes would get 8 tots and 70 cigarettes and even so beginning with 10 tots and 50 cigarettes B would get 12 tots and 30 cigarettes by exchanging 2 tots for 20 cigarettes In either case there is an improvement in the combinations of A and B This combination of A is superior to the original combination so that geometrically A would have moved on to a higher indifference curve when he gives up 2 tots for 20 cigarettes and similarly B moves up to a higher indifference curve by exchanging 20 cigarettes for 2 tots Thus diagrammatically it was shown in the case of A that we would have a CPL superimposed on his indifference map so that we had a series of indifference curves at various levels, one of which was a tangent to $CPL—AB$ so that at the point where the Indifference Curve just touched the CPL A would have got the best possible combination under the limitation of the fixed income and the rate of exchange 10 cigarettes = 1 tot of rum Similarly in the case of B we superimpose the $CPL—AB$ over the indifference map so that again one of the curves will just touch $CPL—AB$ in

the case of B so that where the Indifference Curve is a tangent to AB B would have obtained the best possible combination under the limitation of a fixed income and rate of exchange The conclusion is that by exchanging between themselves, they stand to gain It is advantageous to both of them to exchange In terms of indifference maps and *CPL* the scales of preferences vary from individual to individual under barter By giving up his rum A is getting cigarettes which he values more than rum and B is getting rum in exchange for cigarettes which he values more than cigarettes, so that when they exchange these commodities A is better off than before and so also is B This is shown by the fact that A has climbed up to the highest indifference curve and so also B Thus in an exchange, when scales of preferences of the parties involved are different, they would be better off after the exchange than before This example of the soldiers A & B with a given ration per week of the two commodities, viz. rum and cigarettes, is symbolic of a consumer with a limited income under a money economy This illustration was based on barter Thus we have soldiers like A who want more cigarettes and soldiers like B who want more rum and they can get more cigarettes and more rum by mutually exchanging their respective commodities Again in the case of a consumer under a money economy, we can work out several combinations of the two commodities of goods If the prices of the goods were fixed and the consumer had a certain amount of money to spend on those two goods, he could divide his money between the two goods If he buys more of one good, he would buy less of the other Thus there will be a list of combinations but in this list it is possible that the consumer may have a preference for some combinations as against others That means given two different combinations one may be better than the other or one may be worse than the other or both the combinations may be equally desirable Therefore, we can conceive of 3 alternative possibilities Suppose our consumer wants to purchase food and clothing[4] Let us say he could have a combination of 3 units of food and 2 units of clothing or he could have two units of food and 3 units of clothing Given these two sets of commodities or these two combina

[4] *Economics, An Introductory Analysis* Paul A Samuelson Ch 23 1951.

tions our consumer might prefer 3 units of food and 2 units of clothing to 2 units of food and 3 units of clothing or a second alternative might be, he might prefer 2 units of food and 3 units of clothing to 3 units of food to 2 units of clothing or yet another possibility is that he might be indifferent between these two combinations Let us assume that our consumer is indifferent between the two combinations and further there are still other combinations so that we have again an indifference schedule

Food	1	2	3	4
Clothing	6	3	2	½

Therefore, our consumer would be indifferent between these different combinations of the two commodities On the basis of this we can again draw an Indifference Curve of the consumer

Once again the significance of the curves is that the consumer by moving along the curve is neither better off nor worse off than before, i e the combinations along the curve are of equal value Now, as before, we could draw more indifference curves thereby obtaining an indifference map We can draw more indifference curves in the diagram if either the purchasing power of the consumer changes—increases or decreases Then on the basis of the new schedule we can have an indifference curve higher up This would be possible even if his income remains as before but prices fall so that with the same money he could purchase more of food and more of clothing In either case i e whether prices fall or his money income increases in amount, he can have a better combination of the two commodities than before and these combinations would be along the new indifference curve On the contrary, if his money income should diminish or the prices of food ard clothing should rise, he could buy less of food and clothing than before and once again we have a number of combinations between which he would be indifferent and these new combinations would be on a lower indifference curve so that we get an indifference map Combinations lying on one indifference curve will be of equal value to the consumer

Thus, all combinations lying along curve U_1 will be of the same significance but combinations along the higher curve

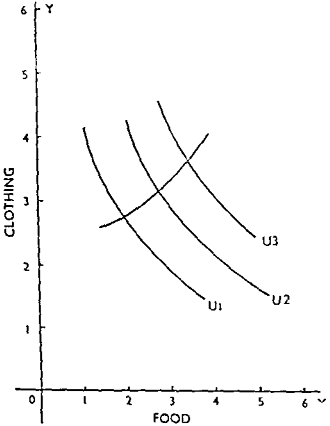


Figure 4

will have greater significance than combinations on a lower curve Any combination on a higher curve is better than any combination on a lower curve Therefore, it follows from this that a movement along the same indifference curve makes no difference to the consumer whereas a movement from one indifference curve to a higher Indifference Curve would signify a better combination than before, and conversely, a movement from a higher Indifference Curve to a lower Indifference Curve

signifies a worse combination than before Thus, if our consumer would move up from U_1 to U_2 and from U_2 to U_3, crossing the indifference curves in a north easterly direction, he would be obtaining better combinations, but if he moves from U_3 to U_2 and U_2 to U_1 once again crossing the indifference curves in a south westerly direction, he would get worse combinations Therefore, we have obtained an indifference map of a given consumer with a limited income and given prices and with either income-changes or price-changes he can have numerous combinations showing better or worse combinations

Suppose our consumer has got an income of 6 dollars per day and a unit of food costs 1½ dollars and a unit of clothing 1 dollar These are the prices of the two commodities and the income of the individual per day As before, our consumer with 6 dollars per day and the price of the commodities given can either spend all his money on food alone or clothing alone or between the two Assuming he spends on food, he can get only 4 units of food, similarly, if he spends on clothing he can get 6 units of clothing Thus two possibilities are open to the consumer—either he can stay at *N* or stay at *M* or move down the line or up the line, *NM*

He can move down towards *M* getting different combinations and move up the line getting different combinations So this line *NM* is the consumption possibility line representing various possibilities open to the consumer But the various combinations lying along the *CPL* are not necessarily equal in value Different combinations may have different significance But on some point on the *CPL—NM* he might reach the best combination among the different combinations which are open to him How to discover this combination which is the best? Geometrically or graphically we discover this combination by superimposing the indifference map over the *CPL* so that *CPL* will be tangential to one of the indifference curves and the point of tangency will represent the equilibrium position of the consumer The consumer would reach that one which is tangential to that line The curves which are crossed by *CPL* represent different combinations which are inferior Therefore, by moving along the line from the points

where the curves cross the line, the consumer can reach higher indifference curves Assuming that the consumer wants

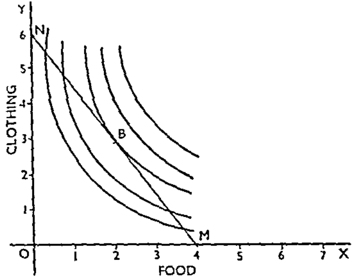


Figure 6

to spend all his money on the goods he would move to the point on the *CPL* which is tangential to an indifference curve However, with his income and the given prices, he cannot reach higher indifference curves than the one that touches *CPL* at *B* By moving from lower indifference curves to the point *B*, the consumer would achieve his equilibrium position representing the best possible combination of the two commodities with his given income and the prices ruling in the market

Consumption and Changes in Income and Prices

We shall now see the effect of changes in income and changes in price on the equilibrium of the consumer Again we shall use the example of a given consumer buying two goods, food and clothing in the market. Hitherto we had assumed that the income of our consumer was 6 dollars per day and the prices of food and clothing were respectively 1½

and 1 dollar per unit Then we constructed the *CPL* for the consumer and determined the equilibrium position at the point of tangency between *NM* and the indifference curve touching *NM* at point *B* In this figure we saw that the consumer had various possibilities open to him By spending 6 dollars on food alone at 1½ dollars a unit, he could buy 4 units or by buying clothing alone he could buy 6 units of clothing and in between these two extremes he could buy combinations of two commodities by moving away from *N* downward and from *M* up the line Therefore each different point on *NM* stands for a combination of clothing and food Suppose the income of our consumer is 3 dollars and the prices of food and clothing are the same as before i e $1½ and $1 per unit respectively

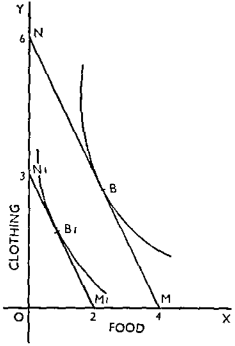


Figure 6

Previously the *CPL* was *NM* To this *CPL* an indifference curve was tangential at *B* With 3 dollars a day our customer

in his income The new equilibrium position of the consumer will be B_2 and B_2 represents a better combination than B or combination B_2 will consist of larger amounts of food and clothing than combination B What is the conclusion which

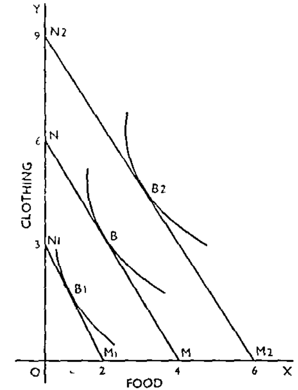


Figure 7

we may derive from these changes in income with constant prices? What happens to the equilibrium of the consumer when his income diminishes from 6 dollars to \$3 what happens to his equilibrium when his income increases from \$6 to \$9? With a fall in his income while prices remain the same the consumer is worse off than before so that his new equilibrium position B_1 in Fig 7 is nearer O or he is on a lower indifference curve With an increase in his income with

less food, due to a rise in price and a fall in value of money, with a given income the consumer can buy a smaller amount of each commodity than before If he had chosen to buy only clothing his position would not be any the worse but it would be the same If he has chosen to buy food alone he would be at M_1 B_1 will be nearer the origin O We can go on increasing the price of food so that once again there is a shift in the *CPL* If there should be, however, a further rise in the price of food, we can have a new *CPL* nearer the origin O He will find new points of tangency between the new *CPL* and indifference curves which touch the *CPL* Let us suppose the price of food now remains the same as before i e, $1½ per unit while the price of clothing rises to $2 from $1

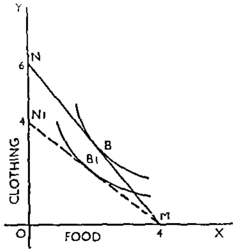


Figure 9

Spending all his money on food alone he can get 4 units, i e *OM* would measure the amount of food he can buy at $1½ with $6 Spending $6 on clothing he can buy only 4 units There is a new *CPL* Thus with the rise in the price of clothing and a given income his purchasing power would be less than before so that with the same money he can pur chase smaller amounts of the two commodities The equili brium position of the consumer on the new *CPL* N_1M is B_1

vely B is the equilibrium position of the consumer with an income of \$6 per day and the prices of food and clothing as before B_1 is the equilibrium position of the consumer with \$3 a day and the prices of food and clothing once again as before By joining tangents B_2, B and B_1, we get a curve called the Expenditure Curve, $B_2 B B_1$ The Expenditure Curve shows how the consumer would move towards the origin O with every decrease in his income and away from the origin O with every increase in his income Thus, with a decrease from \$9 to \$6 per day the consumer moves from B_2 to B thereby getting nearer O With an increase in his income from \$3 to \$6 he moves from B_1 to B getting farther away from O, and as he gets nearer O he can obtain combinations of the two goods which are worse than the previous combinations As his income falls while prices remain the same, he can spend less and less and therefore he would be worse off while as his income increases and prices remain the same he can spend more and more and therefore he is better off The Expenditure Curve helps to determine the quantity of the two goods bought at different levels of income By drawing co-ordinates from any point on the Expenditure Curve to meet the axes OX and OY the quantities can be determined Thus from B_2 co-ordinates are drawn to meet OY and OX OY_1 of clothing and OX of food will be obtained by the consumer when he is at B Similarly we can determine the quantities of food and clothing when the consumer is at any other point of the Expenditure Curve, i e the Expenditure Curve shows at a glance the position of the consumer with varying amounts of income

Demand Curve

Fig 11 shows a consumer with a given income buying food and clothing the price of clothing remaining constant and the price of food rising With every rise in the price of food the CPL—NM shifts around N to NM NM_1, NM_2 and so on With the shift in the CPL the equilibrium position of the consumer shifts from B to B_1 B_1 to B B_2 to B_3 and so on i e as food becomes dearer the consumer can buy less and less of the two goods so that he gets nearer and nearer O When B B_1 B_2 are joined we get a curve called

the Demand Curve which shows the change in the position of the consumer due to a rise in the price. Conversely, with

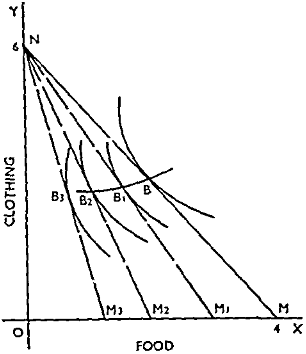


Figure 11

every fall in the price of food the consumer can buy more and more of the two goods and he reaches a higher and higher equilibrium position getting farther away from *O*. The Demand Curve enables one to determine at a glance the quantities of the two goods at different price levels which the consumer can buy. To determine at any point on the Demand Curve how much he can buy of the two goods from that point co-ordinates are drawn to meet the axes *OX* and *OY*.

Properties of Indifference Curves

We shall examine the characteristics of Indifference Curves

One characteristic is that Indifference Curves slope down wards from left to right.

We shall examine this presently Before doing so let us consider the logical inferences or conclusions which would follow if we assume that Indifference Curves do not slope downwards from left to right If they do not slope down wards from left to right they can be horizontal or they must slope upwards from left to right First of all let us take up a horizontal Indifference Curve (Fig 12)

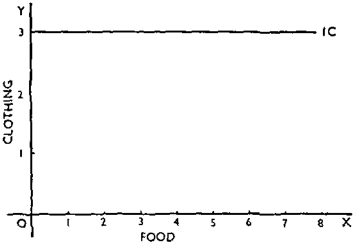


Figure 12

What would be the implications of a horizontal Indiffer ence Curve? All the combinations along the curve are of equal value 3 units of clothing and one unit of food 3 units of clothing and 2 units of food 3 units of clothing and 3 units of food 3 units of clothing and 4 units of food 3 units of clothing and 5 units of food upto 3 units of clothing and 7 units of food are the various combinations on the Indiffer ence Curve But by assumption these combinations were equal in value because they are on an Indifference Curve But this conclusion cannot bear examination as it is unacceptable be cause 3 units of clothing and 2 units of food is better than 3 units of clothing and 1 unit of food' Even so 3 units of

clothing and 3 units of food is better than the combination 3 units of clothing and 2 units of food and so on. In other words a larger amount of food with the same amount of clothing would be preferable to a smaller amount of food and the same amount of clothing Hence, each succeeding combination is better than the previous one, so much so the consumer cannot be indifferent between the various combinations He would prefer a combination including a larger amount of one commodity with the same amount of the other to a combination including a smaller amount of one commodity with the same amount of the other Therefore, an Indifference Curve cannot be horizontal since different combinations on the curve will differ in significance

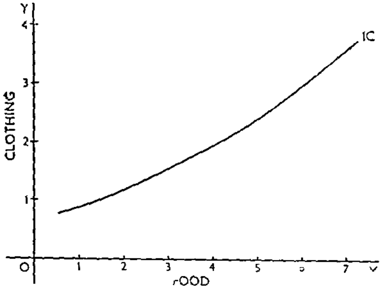


Figure 13

The second alternative to a downward sloping Indifference Curve would be an upward sloping Indifference Curve The implications of an upward sloping Indifference Curve are as follows

Different combinations on the curve must be of equal

value so that the consumer would be indifferent between the combinations Thus combinations of 1 unit of clothing and 1 unit of food 2 units of clothing and 4 units of food 3 units of clothing and 6 units of food must be of equal value Once again this is an absurd conclusion as the second combination consists of a larger amount of both food and clothing than the first Even so the third combination has a larger amount of food and clothing than the second and so on Obviously the second combination is better than the first and the third better than the second and so on Then the consumer would prefer the combination containing more of food and clothing to one containing less of food and clothing Therefore the consumer prefers some combinations to others He cannot be indifferent between them An Indifference Curve therefore cannot slope upwards from left to right because in that case the different combinations on such a curve will be of different significance and not of equal significance Con

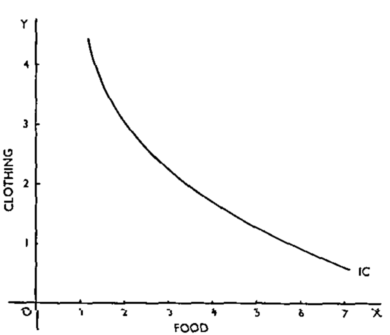


Figure 14

sequently, an Indifference Curve must slope downwards from left to right.

The implications of a downward sloping Indifference Curve would be, again, all combinations of food and clothing on the curve are of equal value

1	4	units of clothing and	$1\frac{1}{2}$	units of food
2	3	—do—	2	—do—
3	2	—do—	$3\frac{1}{2}$	—do—
4	1	—do—	6	—do—

Thus, in the second combination the quantity of clothing diminishes but at the same time the quantity of food increases. Similarly, in the third combination as clothing diminishes further, food increases and similarly in the fourth combination as clothing decreases food increases. Therefore, the fall in the amount of clothing is offset by a rise in the amount of food and vice-versa. Therefore, all the combinations can be of equal value or significance so that the consumer is indifferent

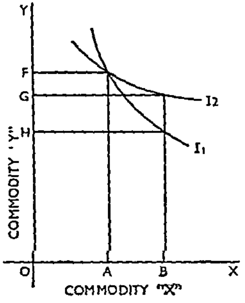


Figure 16

between them The conclusion is that indifference curves can slope only downwards from left to right They can neither be horizontal nor slope upwards from left to right

A second characteristic of indifference curves is that they cannot intersect If they should intersect we arrive at absurd conclusions

We can explain this property by deriving equations Let *OX* measure commodity *X* and *OY* measure commodity *Y* I_1 and I_2 are two Indifference Curves crossing each other and intersecting We can derive the equations as follows
Taking Indifference Curve No 2, first

$$OA \text{ of } X \text{ plus } OF \text{ of } Y - OB \text{ of } X \text{ plus } OG \text{ of } Y$$

Now in the Indifference Curve No 1 again *OA* of *X* plus *OF* of *Y*–*OB* of *X* plus *OH* of *Y* Hence *OB* of *X* plus *OG* of *Y*=*OB* of *X* plus *OH* of *Y*

Therefore, *OG* of *Y*=*OH* of *Y*

But the conclusions that *OG* of *Y*=*OH* of *Y* is absurd

In Fig 16 again indifference curve I_1 and I_2 are made to

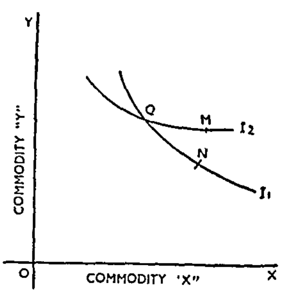


Figure 16

cross or intersect at point Q Point M on Indifference Curve No 2 is above point N on indifference curve No 1 Hence combination M should be better than combination N But combination M is equal to combination Q and combination N is also equal to combination Q since Q is common to both the indifference curves being the point of intersection If M and N are equal to Q M and N will be equal to each other which is again absurd

The third characteristic of Indifference Curves is that indifference curves are convex to the origin. This may be illustrated by Fig 17

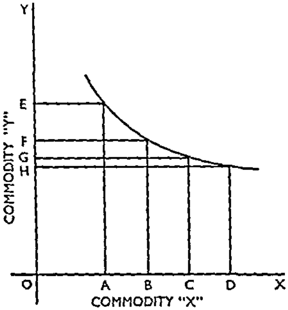


Figure 17

We observe that along OX we have made $AB=BC=CD$, these representing 3 equal units of commodity X In order to get more Y, the consumer will exchange his X for Y For CD of X he can get GH of Y Therefore, the significance of CD in terms of Y is GH In other words measuring the value of X in terms of Y, CD is equal to GH In exchange for BC the consumer gets FG Therefore, the significance of BC

in terms of Y is FG But FG is greater than GH Hence the significance of BC in terms of Y is greater than the significance of CD in terms of Y Further in exchange for AB of X the consumer can get EF of Y Hence the significance of AB in terms of Y is EF Once again EF is greater than FG Hence the significance of AB in terms of Y is greater than the significance of BC in terms of Y The marginal significance of OD of X is the significance of the last unit of X, i e the significance of CD and the significance of CD, measured in terms of Y, is GH Therefore, in terms of Y the marginal significance of OD is GH Similarly the marginal significance OC of X is the significance of the last unit of X, i e the significance of BC In terms of Y the significance of BC is FG i e the marginal significance of OC in terms of Y is FG The marginal significance of OB of X is the significance of the last or the marginal unit of X, i e the significance of AB of X The significance of AB in terms of Y is EF or the marginal significance of OB in terms of Y is EF Thus as the amount of the commodity X decreases from OD to OC, its marginal significance increases Similarly, when the amount of X decreases from OC to OB, the marginal significance of X further increases Conversely, the marginal significance would decrease with an increase in X

In Fig 18, the consumer gets AB of X in exchange for EF of Y BC of X in exchange for FG of Y and CD of X in exchange for GH of Y The significance or utility of EF of Y in terms of X is AB The significance of FG of Y in terms of X is BC and the significance of GH of Y in terms of X is CD The marginal significance of OE of Y is the significance of the marginal unit of Y viz. EF of Y and the significance of EF of Y in terms of X is AB i e the marginal significance of OE of Y in terms of X is AB Again the marginal significance of OF of Y is the significance of the last unit of OF i e FG and the marginal significance of OF of Y is BC in terms of X The marginal significance of OG of Y is the significance of the marginal unit of Y, i e GH and the significance of GH is CD in terms of X or the marginal significance of OG in terms of X is CD

The marginal significance of OE of Y is AB The marginal significance of OF of Y is BC and the marginal signifi

cance of OG of Y is CD BC is greater than AB and CD is greater than BC, i e as the quantity of Y decreases from OE

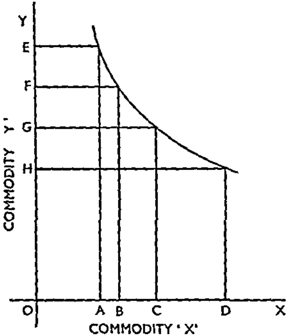


Figure 18

to OF, its marginal significance increases from AB to BC and further as the quantity of Y decreases from OF to OG, its marginal significance increases still further from BC to CD Therefore, with the decrease in the quantity of Y, its marginal significance in terms of X increases Conversely, with an increase in the quantity of Y its marginal significance in terms of X decreases Thus the marginal significance of OG in terms of X is CD, the marginal significance of OF in terms of X is BC and the marginal significance of OE in terms of X is AB And BC is smaller than CD and AB is smaller than BC while EF, FG and GH are of equal length Due to the Diminishing Marginal Utility or significance of one commodity, in terms of the other, X in terms of Y, or Y in terms of X, an indifference curve is convex to the origin O

Let us see what conclusions would result from a concave indifference curve, one which is concave to the origin O

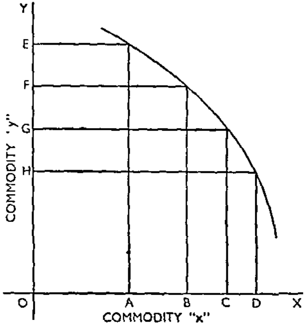


Figure 19

Again, by exchanging EF of Y the consumer can get AB of X The significance of EF in terms of X is AB In exchange for FG of Y the consumer can get BC of X Therefore, the significance of FG in terms of X is BC In exchange for GH of Y, the consumer can get CD of X Therefore, the significance of GH in terms of X is CD The marginal significance of OE of Y, i e the significance of EF in terms of X is AB The marginal significance of OF of Y i e the significance of FG of Y in terms of X is BC and the marginal significance of OG of Y or the significance of GH in terms of X is CD Thus, BC is less than AB and CD is less than BC But EF FG and GH are equal With the decrease in the quantity of Y from OE to OF the marginal significance of Y in terms of X decreases from AB to BC and with a further decrease in the quantity of Y from OF to OG its marginal significance in terms of X decreases from BC to CD

With a decrease in the quantity of Y, its marginal significance in terms of X is seen to decrease but as a matter of fact, when a commodity decreases, its value or significance must increase and the significance of the commodity is measured in terms of another commodity so that a larger quantity of the second commodity would be demanded in exchange for each unit of the first commodity given up Thus, the shape of the indifference curve viz one which is concave goes contrary to the Law of Diminishing Marginal Utility Hence under normal conditions when the marginal utility or significance of a commodity in terms of another varies inversely with its quantity, *Indifference Curves must be convex to the origin* Therefore, the third property or characteristic of indifference curves is that they are normally convex to the origin O ✓

IV INDIFFERENCE CURVES FOR MORE THAN TWO GOODS

Our discussions on Indifference Curves was based on the assumption that there were only two commodities and the consumer had different combinations of these two and in order to achieve equilibrium in his satisfaction he sought to reach the highest possible Indifference Curve In order to make the Indifference Curve analysis more realistic, we shall include in the scale of preferences of the consumer or the purchaser not only two goods but several goods Now, therefore, how should we proceed to include many goods or more than two goods? For instance, in our example we assumed food and clothing, rum and cigarettes, commodities X and Y Therefore, in all these we have just two commodities and we constructed Indifference Curves and Indifference Maps and *CPLs* and by superimposing Indifference Maps over *CPLs* of the consumers we derived the equilibrium position of the consumer In order to include more than two goods in the indifference curve analysis we shall take one commodity on the one hand and money on the other hand, money representing general purchasing power and therefore, all other goods which money can buy For instance, in a two dimensional diagram, one dimension would then stand for money, general purchasing power and the other axis would stand for a commodity,

say Food This implies that the consumer would have combinations of money and food, money standing for all other commodities which means combinations of food and other commodities However, our discussion on these lines must be based on certain assumptions (*i*) The consumer can have different combinations of money and food between which he would be indifferent (*ii*) He has a given amount of money which he divides between food and other goods (*iii*) The prices of all goods are fixed in the market which means that we assume competitive conditions so that prices at any moment are governed by competition, so that no one individual consumer can alter the price (*iv*) All goods are homogeneous and indivisible (*v*) The consumer acts rationally in the sense that given a money income and the prices of goods, he would try to maximise his satisfaction On these assumptions we can draw an Indifference Map of the consumer

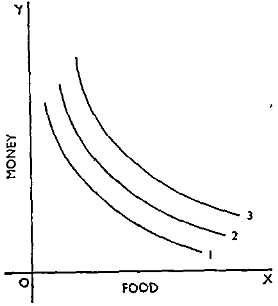


Figure 20

As we know, these curves are based on different Indifference Schedules and they are at different levels and all combinations

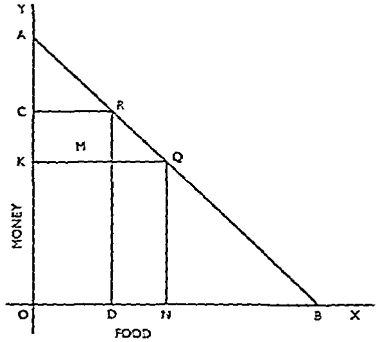


Figure 21

spends OA on OB food, the price of food would be OB/OA In other words, at the price OB/OA, the consumer can get OB food if he spends OA, but if he keeps some money and spends the rest on food, he would be on the line AB If he keeps all his money, he will be at point A If he spends all his money, he will be at point B But by buying food and buying other commodities represented by money, he would be at some point on the line AB, e g at R on AB, he would have a combination of OD food and OC amount of money which would mean OD food and goods represented by OC money At Q similarly, he would have ON food and OK money representing other goods This implies that as he buys more and more of food, he would have less and less money to spend on other goods so that as he increases his purchases of food in his combinations of food and money or other goods, there will be greater amount of food and smaller amount of other goods With his money OA and the price of food OB/OA he cannot reach point L Only with a larger income or a lower price of food his CPL can shift to the right, enabling him to reach point L But with given income, OA and OB/OA price of food, he can have combinations of food and money representing other goods, which lie along AB He will not be at point M inside AB, since by assumption he spends all his OA money on food and other commodities Therefore the consumer under given market conditions and his income will have different opportunities of consumption along the path of AB

The next operation is the superimposing of one diagram over the other and finding out the equilibrium position of the consumer (Fig 22)

Suppose the consumer is at A Indifference Curve 1 and AB meet on OY at point A The consumer starts from A and he wants to rise to a higher Indifference Curve because as we know the aim of the consumer with a given income and market conditions is to reach the highest possible Indifference Curve and thereby maximise his satisfaction Suppose he is on Indifference Curve 1 at A By moving on the line AB he can reach Indifference Curve 2 at the point E i e by spending some money on food he increases his satisfaction by moving from A to E, by exchanging more money for food

or by buying more food By moving further down the line he can reach the third Indifference Curve at *F*, and he can

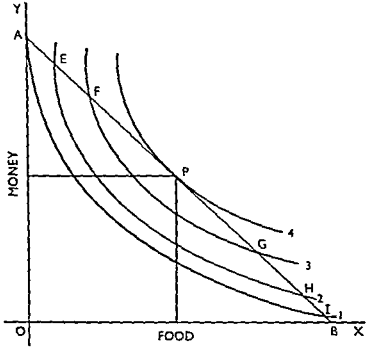


Figure 22

still further increase his satisfaction from food and money by reaching point *P* on the Indifference Curve 4 However, if the consumer buys more food by moving down the line to point *G*, he will reach a lower Indifference Curve i e Indifference Curve 3 Hence at *G* his satisfaction from food and money will be less than at *P* Even so if he continues to buy food and reaches point *H*, he will reach Indifference Curve 2 Therefore he will be on the highest Indifference Curve at point *P* on Indifference Curve 4 *P* represents the best possible combination of food and money and the consumer will be in equilibrium whereas at any other point, *E* or *F* or *G* or *H*, his satisfaction from food and money will not be maximum Therefore, the consumer distributes his money among

food and other goods at the point where AB in the diagram is tangential to Indifference Curve 4, at P

From this point we shall now proceed to explain why at E & F, G & H, our consumer is not in equilibrium The explanation will be in terms of the marginal significance or utility of food in terms of money At point E, the marginal significance or utility of food in terms of money is greater than the price of food The marginal significance of food refers to the significance of the marginal lb or last lb of food purchased At E, therefore, food to the consumer is cheap at price OB/OA Hence, he could buy more food at OB/OA price Similarly at F, the marginal significance of food, i e the marginal utility of food in terms of money, is greater than the price of food which means that the consumer considers food at OB/OA cheaper, and hence buys more food On the other hand at G the marginal significance of food in terms of money is less than the price OB/OA or food is dear at price OB/OA so that he prefers not to buy more food and similarly at H, the marginal significance of food in terms of money is less than the price of food OB/OA Hence again, food is dear at price OB/OA at point H At P the marginal significance of food in terms of money equals the price of food At E & F therefore, the marginal significance of food in terms of money being greater than the price of food he values food more than money and proceeds to exchange his money for food At G & H where the marginal significance of food in terms of money is less than the price of food, he values money more than food Hence he prefers to have money instead of food At P he values food and money equally Consequently, he is in equilibrium This equality between the marginal significance of food in terms of money and the price of food OB/OA marks the equilibrium position of the consumer This can be explained in terms of the slope of the price line AB and the slope of the Indifference Curves

V THE SLOPE OF INDIFFERENCE CURVES

We shall use the example of the consumer who has \$6 per day to spend which he uses to purchase food and clothing—

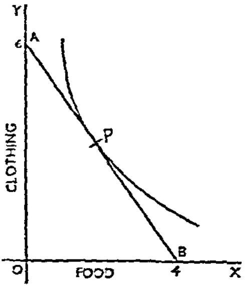


Figure 23

is, converted to money, 4 units of food will equal 6 units of clothing because 4 units of food and 6 units of clothing will be equated with six dollars This would mean that in terms of money food costs $1\frac{1}{2}$ times what clothing costs

In the light of this we shall now explain the equilibrium position of the consumer

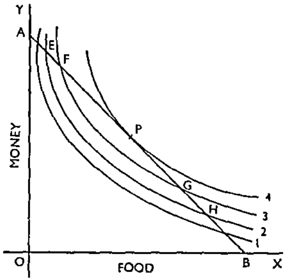


Figure 24

The slope of the line AB is OA/OB and the slope of the Indifference Curve 4 at point P is also OA/OB, i e because at P, AB is tangential to Indifference Curve 4 because it crosses OY at A and OX at B, the slope of the line AB at P and the Curve 4 at P is OA/OB At E, for example, the Indifference Curve 2 is steeper than the line AB or at E the slope of the Indifference Curve 2 is greater than the slope of the line AB Again at F the slope of the Indifference Curve 3 is greater than the slope of the line AB In other words, at F the Indifference Curve 3 is steeper than the line AB At G on the other hand, Indifference Curve 3 is flatter than the line AB, i e the slope of Indifference Curve 3 at G is less than the slope of AB Similarly,

the Indifference Curve 2 at H is flatter than the line AB or the slope of the Indifference Curve 2 at H is less than the slope of the line AB Only at point P the slope of the Indifference Curve 4 and the slope of the line AB are equal which means the marginal significance of food in terms of money, shown by Indifference Curve 4, is equal to the price of food shown by Price Line AB At E and F, where the slopes of the Indifference Curves 2 & 3 are greater than the slope of AB the marginal significance of food in terms of money is greater than the price of food, i e. at E and F the consumer will be willing to pay a higher price than OA/OB Hence, at a lower price of OA/OB he would buy more food. But at G and H, where the slopes of Curves 2 and 3 are less than the slope of AB, the marginal significance of food, in terms of money, is less than the price OA/OB i e he is willing to pay less than OA/OB Hence, he would buy less food In terms of the slopes of Indifference Curves, therefore, the steeper the Indifference Curve or the greater the slope of the Indifference Curve, the higher the marginal significance of food in terms of money and the flatter the Indifference Curve, the smaller the marginal significance of food in terms of money

Our analysis was in terms of one commodity and money representing other commodities, as in the example of money and food Given money and food we could by means of Indifference Curves, determine the equilibrium of the consumer in terms of the marginal significance of food in terms of money and the price of food and in terms of the slopes of the Indifference Curves and the Consumption Possibility Line or the Price Line In the same way we might determine a consumer's equilibrium when two goods or commodities are given which are exchanged for each other so that their exchange values are expressed in terms of each other Such a case is illustrated by an Indifference Curve (Fig 25) in which OX on the X axis stands for good 'X' and OY on the Y axis stands for good 'Y'

One assumption on which our diagram is based is that the consumer may be paid in X or in Y, i e. he may be given OA of X or OB of Y (here X refers to commodity X) If he has OA of X, he can acquire Y through exchange and

if he has OB of Y, he can acquire X through exchange and the combinations of X and Y obtained through exchange are

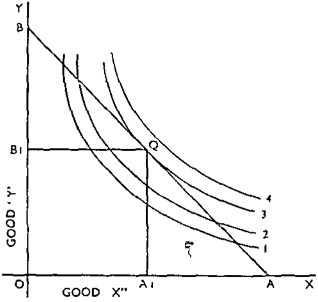


Figure 25

shown by the line BA In other words, AB or BA is the Consumption Possibility Line or Price Line and the equilibrium of the consumer is at Q where the Consumption Possibility Line is tangential to Indifference Curve 3 When he is at Q, he possesses OB_1 of Y and OA_1 of X The slope of the line BA is OB/OA and the slope of the line indicates the rate at which X and Y exchange for each other In terms of marginal significance, at Q the marginal significance of X in terms of Y is equal to the Price of X in terms of Y, i e the amount of Y which exchanges for a unit of X Therefore, at Q the consumer is in equilibrium

We next pass on to another concept known as the Income Effect under Indifference Curve analysis

So far we have assumed a consumer with a given income buying two different commodities at given prices We must consider the effect of a change in his income on his consump-

tion of the two goods provided the prices of the goods remained unchanged If the prices are constant a change in his money income would lead to a better or worse equilibrium position for the consumer, i.e if his money income increases, he will be better off and if his money income decreases, he will be worse off This effect of an increase and decrease in the money income on the consumption of the two commodities is called the Income Effect and the income effect can be shown on an Indifference Map

VI INCOME CONSUMPTION CURVE

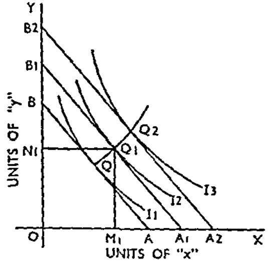


Figure 26

In Fig 26 we have two commodities *X* and *Y* instead of money and one commodity The figure illustrates changes in the income of the consumer with given prices With a given income the consumer will buy *OB* of *Y* or *OA* of *X* or combinations of *X* and *Y* shown by *AB* The consumer will be in equilibrium at *Q* when *AB* touches Indifference Curve 1. If his income should increase, from *OB* to OB_1 in terms of *Y* or from *OA* to OA_1 in terms of *X*, he can buy more of *X* and *Y* Therefore, the various combinations containing larger amounts of *X* and *Y* are shown by the Consumption Possibi

lity Line B_1A_1 Again the equilibrium of the consumer is at Q_1 where B_1A_1 touches Indifference Curve 2 At Q_1 the consumer will have ON_1 of Y and OM_1 of X Similarly, with every increase in his income, such as from OB_1 to OB_2, in terms of Y and OA_1 to OA_2, in terms of X, the equilibrium of the consumer moves away from the origin O Thus, he moves from Q to Q_1, Q_1 to Q_2 and so on. The line drawn through Q, Q_1 Q_2 is the Income Consumption Curve or the Expenditure Curve

The Income Consumption Curve shows the Income Effect, viz with every increase in his income under given prices the consumer will consume more and more of the two goods and with every decrease in his income, he will consume less and less of the two goods Hence, an increase in money income means a better equilibrium position while a decrease means a worse equilibrium position

In Fig 26 we illustrated the Income Consumption Curve We shall now discuss the shapes of the Income Consumption Curve

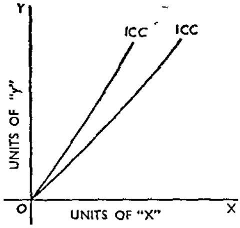


Figure 27

All curves in our figure slope upwards to the right This is the normal shape of the Income Consumption Curve Such a shape of an Income Consumption Curve implies that as a

consumer's income increases, he will buy more and more of both the goods and conversely, as his income decreases, he would buy less and less of both the goods Sometimes we may have an Income Consumption Curve having a shape as in Fig 28

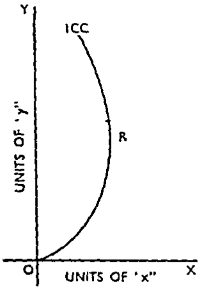


Figure 28

In Income Consumption Curve, beyond a point, say *R*, the direction of the curve changes Thus, as the direction of the Income Consumption Curve changes, the curve slopes upwards to the left.

Now suppose we take an Income Consumption Curve which is normally sloping upwards to the right But it changes its direction at *R* sloping upwards to the left This means that upto *R* as the income of the consumer increases he would buy more and more of *X* and *Y* But beyond *R*, as his income increases, he would purchase less and less of *X* On Income Consumption Curve beyond *R*, as the income of the consumer increases, the consumption of *X* diminishes When the shape of the Income Consumption Curve is normal,

i e the curve slopes upwards to the right as in the previous diagram the Income Effect is said to be positive which means that every increase in his income causes an increase in the consumption of both the goods When the shape of Income Consumption Curve is abnormal as in Fig 28, the Income Effect on the goods is negative For example, in ICC, the income effect on commodity X is negative, i e he buys less and less of X beyond R

The commodity which is consumed less beyond a point when income increases is called an inferior good In the case of Income Consumption Curve (Fig 28) the inferior good will be commodity X

Substitution Effect & Price Effect

Under this we assume changes in prices and a corresponding change in money income with the result that the consumer is neither better off nor worse off than before, i e the real income of the consumer remains the same However, when prices change commodities which are cheaper would

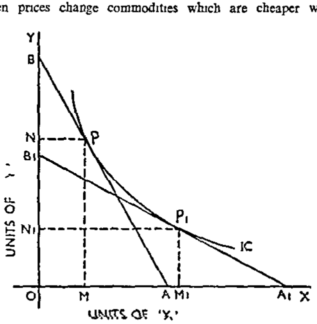


Figure 29

be substituted for commodities which are dearer This result is known as the Substitution Effect.

We assume there are two goods X and Y With his money income, the consumer can buy OB of Y or OA of X or combinations X and Y along BA The equilibrium position of the consumer is P so that at P he gets ON of Y and OM of X This is the original position of the consumer so that the price of Y in terms of X is OA/OB If the price of Y should rise from OA/OB to OA_1/OB_1, he can have OB_1 of Y or OA_1 of X He can have OB_1 of Y which is less than OB because of the rise in the price of Y He can have OA_1 because of the increase in the money income, from OA to OA_1 in terms of X Thus the price of Y has risen and at the same time his money income has increased and the increase in his money income is just enough to compensate the consumer for the rise in the price of Y, i.e the rise in his money income would cancel out the effect of a rise in the price of Y so that his equilibrium is at P_1 on the Indifference Curve 2 and the new price line A_1B_1 The tangency between the line and the curve would determine the equilibrium position of our consumer As a result of a rise in the price of Y from OA/OB to OA_1/OB_1 and an increase in the income in terms of X from OA to OA_1, the consumer has moved from point P to P_1 and by moving from P to P_1 he has substituted X for Y so that at P_1 he has ON_1 of Y and OM_1 of X Of the two goods X and Y Y is relatively dearer than X and therefore, X is substituted for Y However, the combinations at P and P_1 of the two commodities X and Y are both of equal value being on the same Indifference Curve Thus at P_1 the consumer is neither better off nor worse off than at P but he buys more of X due to the rise in the price of commodity Y In the diagram, such a substitution effect is shown by the movement of the consumer along the Indifference Curve and the substitution effect implies that a change in the real income of a consumer due to a change in the prices is compensated by a corresponding change in money income but the relatively cheaper good is bought in the place of the dearer good The change in the money income of the consumer to compensate for the change in the prices is termed compensating variations in income

Price effect

Under this the price of goods may change, income remaining constant so that the consumer is better off or worse off than before, better off when price falls and worse off when price rises

VII PRICE CONSUMPTION CURVE

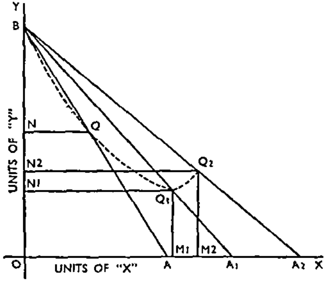


Figure 30

Our assumptions are constant income and varying prices To begin which, suppose the consumer with a given money income can buy *OB* of *Y* or *OA* of *X* or combinations of *X* and *Y* along *BA* Point *Q* on *BA* shows the equilibrium position, the point of tangency Therefore, *Q* is the equili brium position of our consumer With a fall in the price of *X* he can now buy OA_1 of *X* or *OB* of *Y* so that again we get various combinations If there is a further fall in the price of *X* he can buy OA_1 of *X* or *OB* of *Y* since once again the price of *Y* has not altered So on joining *Q*, Q_1 and Q_2, we get a curve called the Price Consumption Curve Thus the Price Consumption Curve *Q* Q_1 and Q_2 shows the price

effect. With a fall in price, the consumer would move to a better equilibrium position as from Q to Q_1 and from Q_1 to Q_2

We shall see how Price Effect includes Income Effect and Substitution Effect. This may be illustrated by Fig. 31

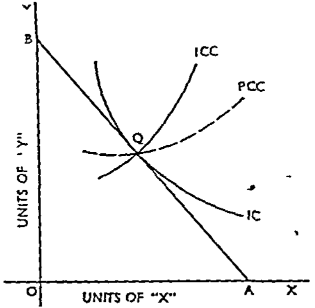


Figure 31

In this figure we have the Income Consumption Curve and Price Consumption Curve. As usual, the consumer with a given income can buy *OB* of commodity *Y* or *OA* of commodity *X* if he spends all his income on *Y* or *X*. Otherwise he can buy combinations of *X* and *Y* which would lie along the line *BA* called the Price Line. The consumer is in equilibrium at point *Q*, the point of tangency between *BA* and the Indifference Curve. Assuming the price of the two goods to be constant, with a change in income the consumer would move along the Income Consumption Curve. Similarly, with a given income but a fall in price of commodity *X* and the price of *Y* remaining constant the consumer can move along the Price Consumption Curve. The significance of this diagram lies in the fact that the Price Consumption Curve is

between the Indifference Curve and the Income Consumption Curve Geometrically this is explained by the fact that the *ICC* represents points of tangency between parallel price lines and indifference curves while the Price Consumption Curve represents points of tangency between flatter and flatter Price Lines and indifference curves Such a position is of significance in explaining how the Price Effect is compounded of Income Effect and Substitution Effect i e to say *PCC* must be between *ICC* and *IC* because Price Effect is made up of both Income Effect and Substitution Effect To show this we shall use the following diagram

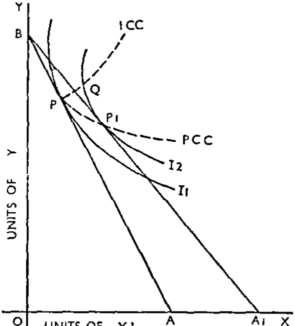


Figure 32

To begin with we have the initial equilibrium position of the consumer at *P* the point of tangency between Indifference Curve 1 and Price Line *BA* i e at *P* the consumer achieves the best possible combination of the two goods *X* & *Y* and

when the price of X falls, he can buy more of X. This is shown by the shift of the line BA to BA_1 Instead of OA of X as before, due to the fall in the price of X, he can now purchase OA_1 of X Therefore, the Consumption Possibility Line shifts from BA to a new position BA_1 As a result of the fall in the price of X the consumer can travel along the curve PCC and arrive at a new equilibrium position P_1 He moves from P to P_1 which represents the best combination of X and Y on the new Price Line BA_1 P_1 is the point of tangency between BA_1 and IC_2 He moves from P on IC_1 to P_1 on IC_2 higher up and farther away from O Instead of a fall in the price of X which has improved his position, if there were a rise in his money income, again he would improve his position by moving along the ICC and reaching point Q on IC_2 The movement from P to Q on ICC represents the Income Effect. Because of the fall in price of X, relatively to Y, it is a cheaper goods. Consequently, he will buy more of X by buying less of Y, thereby in effect substituting X for Y, i e the consumer will not remain at Q on ICC and IC_2 but would travel down IC_2 until he reaches point P_1 The movement from Q to P_1 represents the substitution effect. Therefore, his movement from P to P_1 is equal to his movement from P to Q and from Q to P_1

The question may be asked why when he has reached Q he does not prefer to stay there but moves down to P_1 This is because at Q the marginal significance of commodity X in terms of commodity Y is greater than the price of X in terms of Y, the marginal significance of X in terms of Y being the amount of Y that the consumer must give up for an additional unit of X and the price of X in terms of Y is the rate at which he can exchange Y for X in the market. He is willing to give up more of Y in exchange for X than what is required in the market. This would imply that he values X more than Y so much so he would acquire X and reach P_1 where the marginal significance of X in terms of Y is equal to Price of X in terms of Y or what he is willing to give up is the same as what is required in the market. The same idea may be expressed in terms of slopes of Indifference Curves and Price Lines At Q the Indifference Curve is steeper than the line BA_1 In other words the slope

of Indifference Curve at point Q is greater than the slope of line BA_1. Hence the marginal significance of X in terms of Y is greater than the price of X in terms of Y (at Q). But at P_1 the slope of Indifference Curve 2 and line BA_1 is the same, i.e. the marginal significance of X in terms of Y and the price of X in terms of Y are the same. When the price of a commodity thus falls a larger amount of it is bought. When there is a positive Income Effect and positive Substitution Effect a larger amount is bought due to an increase in his real income consequent on the fall in the price and there is a substitution of a cheaper good due to the relative cheapness of the commodity for the dearer good.

VIII GIFFEN'S PARADOX

There may be exceptions to the rule that a fall in the price of a commodity should result in an expansion in its demand. A fall in price with a given income should result in an increase in the real income of the consumer. If, however, when the real income increases due to the fall in the price of the good or an increase in the money income and the prices remaining constant, if the consumer buys less of the commodity than before we have an example of what is called an inferior good, e.g. margarine is used by the poor but with an increase in the income margarine may be substituted with butter. Thus margarine is wholly or partially replaced by butter leading to a decrease in the purchase of the commodity. But suppose between the two effects, the Income Effect and the Substitution Effect, the Income Effect is negative while the Substitution Effect is positive and outweighs the income effect. Then even in the case of inferior goods a larger amount than before may be bought. We shall illustrate this diagrammatically.

Here the consumer originally was at P on indifference curve 1 and his first Consumption Possibility Line—BA. The price of X is presumed to have fallen so that the line BA shifts to BA_1 showing that with his money he can now buy OA_1 of X instead of OA. Therefore he moves to another equilibrium position on BA_1 and IC_2. Due to a fall in the price of X the consumer's real income has increased and he purchases a larger amount of X. He moves along the PCC but the income effect

is negative instead of positive This is shown by the curve *ICC* which slopes upwards to the left. Instead of buying more of

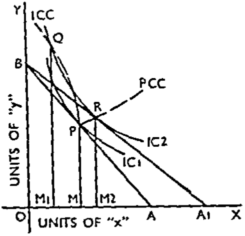


Figure 35

X he will buy less of *X* When he reaches point *Q* along the *ICC* he would buy less of *X* Due to substitution of *X* for the other commodity, he moves from *Q* to point *R*. Therefore, the income effect is shown by his movement from *P* to *Q* and the substitution effect by his movement from *Q* to *R*. But the substitution effect is greater than the income effect so much so that ultimately as a result he buys more of *X* than he had before Therefore, this diagram illustrates how when the price of a commodity *X* falls even though the income effect may be negative, the substitution effect which is positive being stronger than the income effect, the consumer buys more of *X* than before. *The income effect is shown by his movement from P to Q* while the substitution effect is shown by the movement from *Q* to *R* along the IC_2. Substitution effect, therefore, outweighs the negative income effect.

Now let us consider what would happen if the negative income effect were stronger than the positive substitution effect.

With a fall in the price or rise in money income, a smaller amount of a good is bought and with a rise in price or decrease in money income a larger amount will be bought.

This is contrary to the normal laws of demand and hence it is a paradox associated with the name of one Sir Robert Giffen in the 19th century and called Giffen's Paradox This happens again in the case of inferior goods on which a larger proportion of one's income may be spent A fall in the price of such a good on which the bulk of the income is spent would considerably increase the real income so that less of it may be bought and more of other better goods or superior substitutes This idea was based on the consumption of bread by working classes in England When the price of bread fell consumers bought less of bread and more of other foods like meat, while when the price of bread rose they bought more of bread Thus, a fall in price led to a contraction in demand and a rise in price to an expansion We may again show this graphically

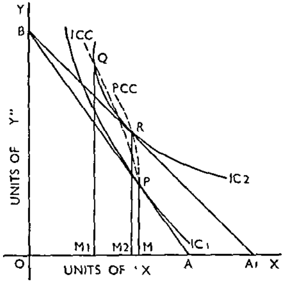


Figure 34

To begin with, the consumer is at P on IC_1 and the price line BA and he buys OM of X The fall in the price of the good is shown by the shift of the line BA to BA_1 but since X is a Giffen good, involving Giffen's paradox, when the price

of X falls, less of X is bought than before Thus the consumer moves from P to R along the PCC to his new equilibrium position on price line BA_1 and IC_1 The income effect is shown by the movement of the consumer from P to Q along ICC which slopes upwards to the left showing that the income effect is negative However, X being cheaper, he substitutes X for other goods and moves from Q to R along IC_1 As a result of the substitution effect he would increase his consumption of X Since the negative income effect is stronger than the positive substitution effect, he would buy less of X than before when the price of X falls (i e at R he will have less of 'X' than at P)

IX DEMAND CURVE DERIVED FROM INDIFFERENCE CURVES

We shall use the indifference curves to derive a demand curve, a demand curve which shows the relationship between the amount demanded and the price

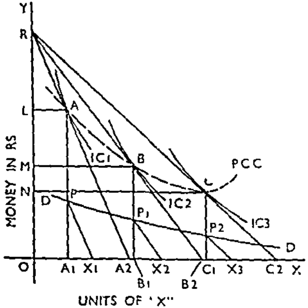


Figure 35

We observe that money is measured along OY and good

X along OX RA_1 is a Price Line. IC_1 is an indifference curve which is tangential to RA_1 at A The consumer is therefore at position A, which is his equilibrium position When he is at A, he purchases OA_1 of X Now the consumer from R moves down the line RA_1 until he reaches A The shift in the price line shows the fall in the price of the commodity X and the consumer has a new equilibrium position at B which is again the point of tangency between IC_2 and price line RB_2 IC_2 is to the right of IC_1 showing a better position than before At B he buys OB_1 of X which means he has spent RM money on commodity X and he retains OM amount of money still With a further fall in the price of X, the price line RB_2 shifts to RC_2 and once again the consumer moves from B to C and at C he has OC_1 of X and ON of money left Now when he is at C he moves down from R to C which means he has spent RN amount of money Therefore at C he would have OC_1 of X and ON money Therefore with every fall in the price of X the consumer moves from one position of equilibrium to another and by drawing a line through these points we get PCC What is the price of commodity X when he is at A on RA_2 and IC_1? The price of the commodity X is the total amount of money divided by the total amount of X purchased so much so is that it OR/OA_2, OR representing money and OA_2 representing amount purchased Therefore the price of one unit of X will be the total amount of money divided by the total amount of commodity X The price of X is the slope of RA_2 or the price of X is RL/OA_1 because RL represents the amount of money he has spent on OA_1 of the commodity Similarly when the consumer is at B the price of the commodity X at B will be OR/OB_2 or the slope of RB_2 or RM/OB_1 Again when he moves down from R to B he has spent RM amount of money and has acquired OB_1 of X At C i e the new equilibrium position the price of X will be OR/OC_2 or the slope of RC_2 or RN/OC_1

Therefore as the consumer moves from A to B and B to C, he is buying more and more of X and at lower and lower prices and we have determined the price of X at A, B and C We can use this to obtain the Demand Curve With the help of indifference curves and Price Lines and the PCC we can

plot points on the diagram and construct the demand curve of the consumer

In order to plot points which when joined would give a demand curve mark off a distance to the right of A_1 representing one unit of commodity X Now suppose $A_1\ X_1$ is one unit of X $A_1\ X_1$ represents one unit of the commodity From X_1 draw a line parallel to RA_1 the price line PX_1 is therefore parallel to the price line RA_1 Being parallel to the price line RA_1 the slope of PX_1 must be the same as the slope of RA_1 and the slope of RA_1 is the price of commodity X and the slope of RA_1 is OR/OA_1 and therefore the slope of PX_1 is PA_1/A_1X_1 and A_1X_1 by assumption is one unit Therefore $PA_1/1$ PA_1 and therefore the price of X is PA_1 At price PA_1 the consumer buys OA_1 of commodity X Similarly mark off a distance B_1X_1 to the right of B_1 which is again a unit of X and from X_1 draw a parallel to the price line RB_1 P_1X_1 therefore is parallel to RB_1 Therefore the slope of P_1X_1 must be the same as the slope of RB_1 being parallel and the slope of RB_1 is price of X

Therefore the price of X at B is P_1B_1 and at P_1B_1 he buys OB_1 of X In the same way to plot another point, mark off a distance C_1X_1 to the right of C_1 Draw a parallel P_2X P_2X_1 will be parallel to price line RC_1 and being parallel its slope must be the same as the slope of RC_1 and the slope of RC_1 is the price of X

By joining PP_1P_2, we get demand curve DD Demand curve DD shows that with every fall in the price of X the amount of X purchased increases Thus from the Indifference map of our consumer we have derived the demand curve of the consumer and this is a conventional demand curve sloping downwards to the right.

The demand curve which we have derived from the indifference curves of the consumer has a normal shape *i e* it slopes downwards to the right signifying that as the price falls demand expands However the shape of the demand curve where Giffen goods are involved will be different The following diagram illustrates a demand curve for a Giffen good or an inferior good

You will notice the demand curve is sloping downwards denoting an expansion in demand with a fall in the price of

the commodity Thus down to price OR the curve slopes normally This may be therefore the first phase of the demand curve DD During this phase of the curve, with every fall in the price of the good or commodity, the real income of the con

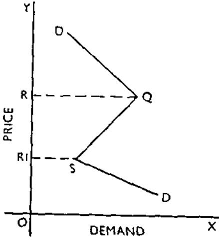


Figure 36

sumer increases The increase in his real income may be equated with an increase in his money income Thus an increase in his purchase may be partly due to the income effect and partly due to the substitution effect, i e as the commodity in question becomes cheaper, he would spend more money on it by spending less on other goods But when the price falls below OR the demand for it diminishes This is shown by the 2nd phase of the curve from Q to S During this phase the curve slopes downward to the left Therefore from Q to S or the 2nd phase of the curve, it slopes downward to the left which means that as the price falls below OR, the income effect becomes negative i e he tends to buy less and less since he would substitute superior goods for this inferior good and, further, although the substitution effect may be present still the income effect outweighs the substitution effect and consequently he diminishes his purchase of the commodity And when the price falls below OR_1 again demand expands with every fall

in price This is shown by the final phase *SD* During this phase the curve slopes downwards to the right. This means that again the consumer can afford to buy more of the good without detriment to other purchases For instance if the Giffen good or the inferior good is bread when the price of bread falls below OR_1 it becomes so cheap that he can buy more and more without affecting his purchase of superior foods like meat and others Summing up we may reach the following conclusions

In most cases individual demand curves slope downward to the right due to the positive income effect and substitution effect causing an expansion in demand in response to a fall in price The increase in demand would occur even if the income effect were negative provided the substitution *effect is strong enough to offset the negative income effect* and when the substitution effect happens to be stronger than the income effect which is negative then the curve will be normal sloping downward to the right Therefore abnormal *demand curves sloping downward to the left are peculiar to* inferior commodities known as Giffen goods

We shall next discuss the shape of the market demand curves In the light of the shapes of the individual demand *curves what generalisations may we make regarding market* demand curves? Market demand curves would be based on individual demand curves In other words the aggregate of individual demands in the market for a good would constitute the *market demand for it i e the market demand schedule would* be the aggregate of individual demand schedules and market demand curves may be constructed by adding together individual demand curves This process is illustrated in the following *diagrams*

A & *B* are both identical diagrams *A* & *B* represent individual demand curves of two persons and *C* the market demand curve which is the result of adding together sideways *A* & *B* Thus *in A at price OR OA amount is demanded* Similarly in diagram *B* at the same price OR_1 again *OA* amount is demanded Therefore together the two buyers would buy in the market at the price *OR* *OA* plus *OA* i e *OB in diagram C OB is double OA* At price *OR* demand is nil i e the starting point of the demand on *OY* at *B*

indicates that at price *OR* nothing is bought Secondly in *C* at price *OR* nothing is demanded With every fall in price below *OR* demand expands Demand curves in *A* & *B* are both normal, sloping downwards to the right Consequently,

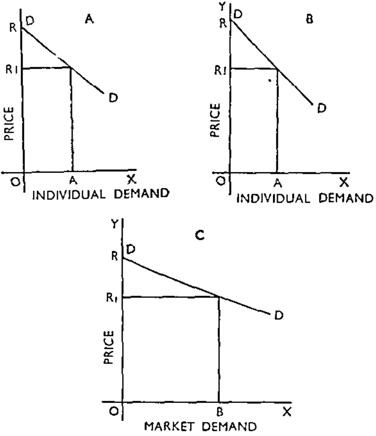


Figure 37

the Market demand curve shown in diagram *C* is also normal, sloping downwards to the right This shows that when prices fall existing buyers buy more and more and in addition new buyers may enter the market thereby adding to demand However, even if no new buyers should enter the market, still owing to the increase in the purchases of the existing

ones demand expands Thus market demand curves tend to slope downwards to the right and be normal Supposing the good in question happens to be a Giffen good to some individual consumers, still the market demand curve would be normal although the individual demand curves of those consumers to whom the good is a Giffen good may be abnormal This is because in the market a Giffen good may be such only to some while to others it may not be a Giffen good so that a fall in its price would cause an expansion in demand Therefore this expansion in demand will outweigh any contraction caused by decreased purchases of some buyers Assuming that the good is a Giffen good to everyone in the market, even then the market demand curve may be normal as the good may be a Giffen good to different individuals over different ranges of prices Again, therefore the aggregate of individual demand curves resulting in a market demand curve will have a normal shape A further reason for market demand curves to have a normal shape, even though the commodity is a Giffen good to all, is that new buyers entering the market must buy more of the good and their actions will offset the effects of the behaviour of existing buyers Hence, market demand curves may be assumed to be normal in shape even though individual demand curves may be abnormal, i e in spite of some individual demand curves sloping downwards to the left, the market demand curve will slope downwards to the right.

X ELASTICITY OF DEMAND

We were discussing the shapes of demand curves and this discussion of the shapes of demand curves individual and market leads to the concept of Elasticity of Demand Normally, we have observed individual demand curves slope downwards to the right and market demand curves are normal even more often Such a shape of demand curves signifies that demand varies inversely as price, i e more being bought at a lower price than at a higher price Further such a relationship between demand and price implies responsiveness of demand to changes in price The degree of responsiveness of demand to price variations differs from commodity to

commodity and there may be various causes of such differing responsiveness of demand Among these the presence and absence of competing substitutes may partly account for the changes in demand in response to changes in price Thus, goods without substitutes tend to have inelastic demand while goods having close substitutes have more elastic demand, as, for example, demand for salt is considered inelastic while demand for radio sets, railway travel etc is elastic because entertaining through radio could be substituted by the cinema or the theatre and even so railway travel could be substituted by road transport Hence, one factor governing the responsiveness of demand is the availability of substitutes Technically, this responsiveness is called Elasticity In economic theory, elasticity of demand has great significance so that an accurate measurement of this elasticity becomes necessary Prof Marshall has sought to measure Elasticity of Demand in terms of unity or one When the change in demand is proportionate to the change in price, elasticity of demand is equal to one When the change is more than proportionate to the change in price, elasticity of demand is greater than one When the change in demand is less than proportionate to the change in price, elasticity of demand is less than one Although the concept of elasticity is simple, certain points in regard to this concept must be borne in mind It is often remarked that the

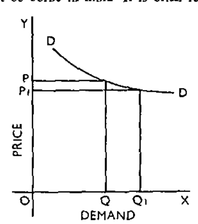


Figure 38

shape of the demand curve can readily indicate the degree of elasticity of demand

Thus, a flat demand curve may denote high elasticity of demand as shown in the diagram A fall in price from OP to OP_1 causes an expansion in demand from OQ to OQ_1 so that the increase in demand is more than proportionate to the change in price as shown by PP_1 and QQ_1 (Fig 38)

A steep demand curve (Fig. 39) may represent inelastic demand Thus, in diagram 39 with a fall in price from OP to

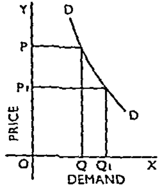


Figure 39

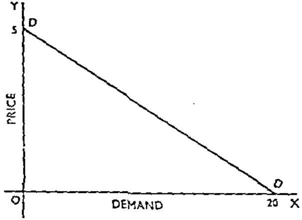


Figure 40

OP_1 demand expands from OQ to OQ_1 so that the expansion in demand is less than proportionate to the fall in price However merely from the slope of a demand curve one can not always infer elasticity of demand for a commodity

This diagram (Fig 40) represents demand schedule for a good Demand Curve—*DD* having a normal shape The point we should note is that the demand curve—*DD* is flat

Along *OX* the scale has been changed in the following diagram while along *OY* the same scale is used

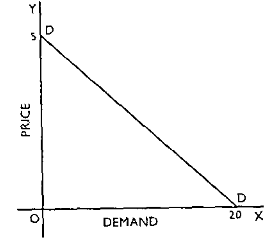


Figure 41

Both these diagrams (Figs 40 and 41) represent the same demand schedule But due to the change in the scale the slope of the demand curve is steeper in diagram 41 Thus in the diagram 40 demand curve *DD* is flatter than in diagram 41 If we are to judge elasticity of demand by the slope of the demand curves diagram 40 should indicate greater elasticity of demand since the demand curve is flatter in it and the diagram 41 lower elasticity of demand since the demand curve is steeper But this conclusion is wrong as both these demand curves are based on the same demand schedule and as such represent the same elasticity Owing to the change made in the scale along the *X* axis the slope of the demand curve is

altered Therefore, the slope of the demand curves may be misleading in measuring elasticity of demand

However, if we take two demand schedules instead of one and if the slope of the demand curves were to vary, this might reflect different elasticities of demand This is shown in the following diagram

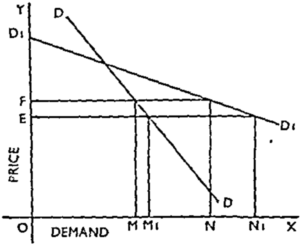


Figure 42

In this diagram the demand for a commodity in two different markets is represented In one market the demand schedule for a good is represented by a demand curve—*DD* In the other market where there is a different demand schedule it is represented by D_1D_1 and curve *DD* is steeper than curve D_1D_1 and at price *OF* along the *Y* axis demand is *OM* in the market with *DD* curve At price *OE* the demand is OM_1 in the market with curve *DD* On the other hand at price *OF* the demand for the good is *ON* in the market with curve D_1D_1 and at price *OE* demand is ON_1 in the market with demand curve D_1D_1 In the first market for a fall in the price by *FE* the expansion in demand is by MM_1 In the second market for the same fall in the price, i e by *FE* expansion in demand is by NN_1 Therefore, when the price falls over the same range *FE*, the responsiveness of demand varies from

one market to the other In the first market represented by *DD* the responsiveness of demand seems to be less than in the market represented by D_1D_1 Thus in the market with a steeper demand curve, elasticity of demand is less and in the market with a flatter demand curve, elasticity of demand is more In this instance the slope of the demand curve reflects the elasticity of demand when the price in both the markets changes over the same range However, the elasticity of demand may vary when the price should change over different ranges This is shown in the following diagram

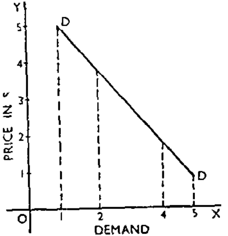


Figure 43

Demand curve *DD* is a straight line The slope of the curve *DD* is constant If elasticity of demand depended on the slope of the curve since the slope of the curve is constant, elasticity of demand must be constant As we will see presently elasticity varies over different price ranges The demand at $5 is one unit and at $4 is 2 units Therefore when price has fallen from $5 to $4 i e by a 5th demand is increased by 1 unit to 2 units i e demand has doubled Demand at $2 is 4 units and at $1 it is 5 units From $2 the price has fallen to $1 thereby becoming half of what it was and demand has increased from 4 units to 5 units, i e by a quarter Thus for a fall in price from $5 to $4 the expansion in demand from

1 unit to 2 units is more than proportionate to the fall in the price For a fall in price from \$2 to one dollar the expansion in demand from 4 units to 5 units is less than proportionate Therefore, over the range \$5 to \$4 demand is more respon sive or elastic than what it is over the range \$2 and one dollar Thus while the slope of the curve is constant elasticity of demand is variable Thus the slope of the curve once again may be no criterion for judging elasticity of demand

Another measure of elasticity of demand is the total out lay on the commodity at different prices The behaviour of total outlay in response to changes in price reflects whether demand is elastic or inelastic or neither elastic nor inelastic The trend of the total outlay is shown by the curve again in the following diagram

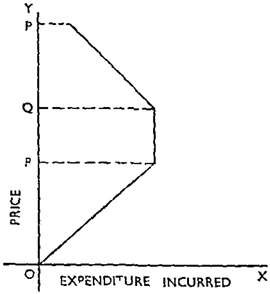


Figure 44

We consider in this diagram 3 different price ranges from price *OP* to *OQ* from *OQ* to *OR* and finally all prices below *OR* The curve slopes downwards to the right as price *falls* from *OP* down to *OQ* showing an increase in outlay with a

fall in price Conversely, with a rise in the price from *OQ* to *OP* total outlay diminishes shown by the curve sloping upwards to the left Thus, over the range *OP* to *OQ* demand is elastic In other words total outlay increases as price falls and decreases as price rises Over the range *OQ* to *OR*, the curve is perpendicular and parallel to *OY* showing that total outlay is constant Thus, as the price falls from *OQ* to *OR* or rises from *OR* to *OQ* total outlay remains constant. Over the range *OR* total outlay diminishes as price falls as shown by the curve sloping downwards to the left and increases as the price rises upto *OR* as shown by the curve sloping upwards to the right Thus, as price falls below *OR*, total outlay diminishes and conversely as the price rises, total outlay increases Over the range *OR* demand is inelastic. Summing up, elasticity of demand is greater than one or demand is elastic when outlay increases with a fall in price and diminishes with a rise in price Elasticity of demand is equal to one, i e demand is neither elastic nor inelastic, when total outlay is constant and elasticity of demand is less than one when total outlay diminishes with a fall in price and increases with a rise in price

Above point *Q* demand was elastic and below point *R* demand was inelastic The price range of *OQ OR* is the dividing line between elasticity and inelasticity The constant outlay over *OR* and *OQ* can be represented in the following two diagrams

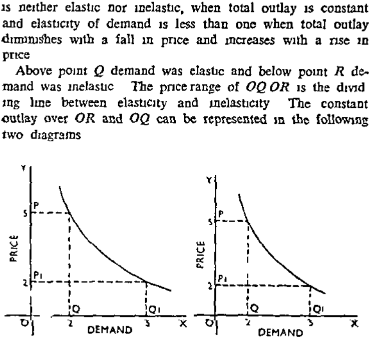


Figure 45

These two figures represent the same demand schedule, in figure 2 the scale is bigger than in figure 1 The two diagrams show constant outlay at various prices Thus at *OP* price, i e 5 units of money, 2 units are demanded and therefore the total outlay is 10 At price OP_1 or 2 units of money 5 units are demand, i e OQ_1 is demanded Hence total outlay is 10 These two rectangles *PQ* and P_1Q_1 represent the total outlay of 10 The same is true of diagram 2 Only the scale is different in 2 Thus both the diagrams are similar Further when the total outlay is thus constant so that over different parts of a demand curve, elasticity of demand is constant, i e equal to one, the demand curve is a rectangular hyperbola and the curve will not touch the axes *OY* and *OX* This is a different way of representing total outlay from the one shown above. Due to the importance of elasticity of demand in economic theory its measurement is very important and therefore elasticity of demand is measured in numerical terms. Prof Marshall thus measured elasticity in terms of unity whereby the degree of elasticity is determined To determine the numerical value of elasticity of demand it may be expressed as follows

$$\frac{\text{Change in amount}}{\text{Amount demanded}} - \frac{\text{Change in price}}{\text{Price}}$$

This formula is used for finding the numerical value of elasticity, whether it is more than one, or less than one or equal to one We may illustrate this by going back to the diagram in which we have the demand curve with a constant slope to show how elasticity of demand varies over different ranges of price We can use this example to illustrate the determination of Elasticity of demand numerically

If you refer to the diagram and the analysis we noted at \$5 the demand was 1 unit and at \$4 the demand was 2 units Now using this formula we can determine the numerical value of elasticity of demand Therefore elasticity of demand

$$= \frac{1}{1} - \frac{1}{5} = 5$$

Therefore, elasticity of demand = 5

Again at \$2 demand was 4 units and at \$1 demand was 5 units

$$\therefore \text{Elasticity of demand} = \frac{1}{4} - \frac{1}{2} = \frac{1}{2}$$

Now what is the significance of the numerical value we have thus obtained? When elasticity of demand=5, it is more than one Demand is elastic Therefore, in this example, when price falls from \$5 to \$4, i e by a 5th, demand expands from 1 unit to 2 units and numerically elasticity of demand=5, i e greater than one and hence demand is elastic which means that the responsiveness of demand to the change in price is more than proportionate to the change in price i e when the price falls the expansion in demand is more than proportionate to the fall and when the price rises the contraction is more than proportionate to the rise in price On the other hand at \$2, 4 units are bought and at \$1, 5 units are bought Therefore, the price is half while demand has increased by a quarter, so much so that numerically elasticity of demand=$\frac{1}{2}$ or it is less than one Hence elasticity of demand is low or demand is inelastic In other words, the responsiveness of demand is less than proportionate to the change in price Thus the contraction in demand for a rise in price is less than proportionate to the rise in price and expansion in demand for a fall in price is again less than proportionate to the fall in price Therefore, in general when elasticity of demand is greater than 1 say 2,5,7,16 demand is elastic while when elasticity of demand is less than 1, say $\frac{1}{2}$ $\frac{1}{4}$, 1/16 and so on, demand is inelastic and when elasticity of demand is equal to 1, demand is neither elastic nor inelastic Numerical elasticity of demand, i e elasticity of demand measured in terms of numbers, helps in knowing the degree of elasticity or, whether demand is elastic or inelastic

We have so far considered demand which is elastic and inelastic and demand which is neither elastic nor inelastic, i e cases of elasticity of demand being greater than one or less than one or equal to one We may now consider extreme degrees of elasticity or inelasticity that is to say, infinite elasticity of demand and infinite inelasticity When elasticity of demand is infinite a slight change in price would cause an infinite change in demand This is shown graphically by a demand curve which is a horizontal straight line parallel to OX

Similarly when demand is infinitely inelastic the demand curve is a vertical straight line parallel to OY Therefore a

horizontal demand curve illustrates infinite elasticity and a vertical or perpendicular demand curve illustrates infinite in-

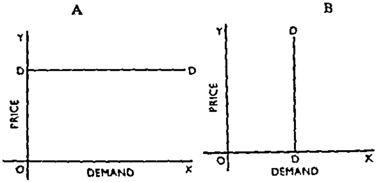


Figure 46

elasticity, i.e. when demand is inelastic no matter what the price is, the same amount is bought. Thus, in the diagram (B) *OQ* will be the amount at different prices In reality elasticity of demand will range between these two limits, i.e. a demand curve is neither perfectly perpendicular nor perfectly horizontal. It tends to be of different shapes, i.e. it may be steep or flat. The steeper it is the nearer it would be to a perpendicular demand curve and the flatter it is the nearer it would be to a horizontal demand curve Therefore, demand curves in actual markets will have different degrees of elasticity We speak of elasticity of demand in relation to demand curves but there is no one single elasticity of demand, for, normally, over different parts of the curve elasticity of demand may be different. This has been illustrated above Therefore, it would be more correct to say that a demand curve will have varying elasticity of demand over different parts of the curve This is the rule but there are exceptions to it. We have come across one such exception already: demand curves which are rectangular hyperbolas have a single elasticity of demand throughout their length. Thus, when the demand curve is a rectangular hyperbola, the total outlay will be constant and the areas of the rectangles inscribed under the curve will be the same showing a constant elasticity of demand Another exception

is a demand curve which is vertical showing infinite inelasticity where the responsiveness of demand remains unaltered at any price, i e the quantity bought is fixed or constant. Therefore, in exceptional circumstances there is a single elasticity of demand over the entire length of a demand curve. Otherwise elasticity of demand varies from point to point on a demand curve

Price Elasticity, Income Elasticity and Elasticity of Substitution

After the discussion on the concept of Elasticity of demand we shall now discuss elasticity of demand in terms of price elasticity, elasticity of substitution and income elasticity Elasticity of demand is also called Price elasticity, which would mean elasticity of demand or responsiveness of demand to changes in price And price elasticity is made up of income elasticity of demand and elasticity of substitution. This is similar to the price effect being made up of income effect and substitution effect If, therefore, price elasticity of demand results from income elasticity and elasticity of substitution, we must define these terms The responsiveness of the person's purchases to changes in his income is called income elasticity Mathematically, income elasticity of demand e_i =

$$\frac{\textit{Proportionate change in the price of good } X}{\textit{Proportionate change in income}}$$

Substituting numerical values suppose the proportionate change in income, say an increase in income, is 1% and the increase in the purchase of X is 10%, then e^1 will be 10/1 – 10% Thus, when the change in income is by 1% and the change in purchase of X is by 10%, income elasticity of demand is 10/1 = 10 Thus, by means of this formula income elasticity is calculated In this example, income elasticity = 10 i e more than one Hence income elasticity is very high or the responsiveness of the consumer's purchase of X to a change in his income is very great. On the other hand suppose the increase in the income is 1% and the increase in the purchase of X is 1/10% The income elasticity – 1/10 x1/1 = 1/10% Here elasticity of demand due to change in income or income elasticity is very low It is less than I In

other words the responsiveness of the consumer's purchase to the change in his income is very little. Therefore, given the prices of goods, when the income of the consumer changes, purchases will change Normally, as we have seen above, the income effect is positive which means more of the good is bought as income increases and less of it is bought as income decreases, and income elasticity, similarly, is normally positive, i.e a rise in income is accompanied by increased purchases and a fall, by decreased purchases. Numerically, income elasticity may have various values, depending on the responsiveness of purchases to fluctuation in income If *income elasticity were zero (0) purchases do not respond to* changes in it. On the other hand if purchases decrease as *income rises, income elasticity is negative.* This would be true of inferior goods. Therefore, generally, where inferior commodities are involved, income elasticity is negative If, however, more is bought when income rises and less, when it falls, income elasticity is positive. Therefore zero income elasticity of demand provides a dividing line between negative income elasticity and positive income elasticity Another numerical value measuring income elasticity is 1 When income elasticity equals one, the purchase of a commodity will change proportionately in response to a change in income. When income elasticity is greater than 1, the change in purchase is more than proportionate to the change in income When the purchase is less than proportionate to the change in income, income elasticity is less than one Again income elasticity=1 or unitary income elasticity may be taken as a dividing line between income elasticity which is very high and income elasticity which is very low In terms of unitary income elasticity luxuries may be defined as those goods in whose case income elasticity is greater than one, i.e as income rises, a greater proportion of it is spent on luxury articles Similarly, necessaries may be defined as goods in whose case income elasticity is less than one i.e as income rises, a decreasing proportion is spent on necessaries. Thus, generally, income elasticity may indicate the nature of goods Another possibility, with regard to expenditure on goods following changes in income is when a consumer's income increases, the whole of the increase may

be spent on a given good in which case income elasticity is said to be equal to $1/KX$ where KX is the proportion of the income spent on the good If therefore, more than the whole of the increase in income is spent on the good, then income elasticity will be greater than $1/KX$ and if less than the whole of the increase in income is spent on the good, income elasticity will be less than $1/KX$ Therefore, numerically income elasticity may be measured to show the changes in purchases caused by changes in income

Coming to elasticity of substitution, it measures the extent to which one good can be substituted for another good so that the new combination of goods yields the same satisfaction or the consumer may be on the same indifference curve With regard to elasticity of substitution one may note the limiting cases One limiting case is where elasticity of substitution is infinite In other words the extent to which one good may be substituted for another is infinite This can happen when the two goods are perfect substitutes in which case economically speaking, they are regarded as one commodity A second limiting case of elasticity of substitution is when elasticity of substitution is zero, implying that one good cannot be substituted for the other This would happen when the goods are used in fixed proportions In practice there is neither infinite elasticity of substitution when goods are perfect substitutes nor zero elasticity of substitution but different degrees of elasticity of substitutes ranging between the two limits Thus elasticity of demand for goods partly depends on the extent to which one commodity can be substituted for another commodity The mathematical formula for elasticity of substitution is

$$\frac{\textit{Relative increase in the ratio between the two goods } X \ \& \ Y}{\textit{Relative decrease in marg significance of } X \textit{ in terms of } Y}$$

If we work with the help of numerical values we get the elasticity of substitution either greater or less or equal to one Finally we come to Price elasticity of demand This concept is similar to the concept of the price effect Like the price effect which is compounded of income effect and substitution effect price elasticity of demand is compounded of

income elasticity and elasticity of substitution, i e elasticity of demand or the degree of responsiveness in demand to a change in price which is called price elasticity depends on income elasticity and elasticity of substitution.

The relationship between price elasticity or simply elasticity of demand income elasticity and elasticity of substitution is brought out in the following equation.

$$e_p = KX \times e_i \text{ plus } (1 - KX)\, e_s$$

Where e_p stands for price elasticity of demand e_i for income elasticity, e_s for elasticity of substitution and KX is the proportion of the income spent on commodity X

Substituting values for these, if $e_i = 2$, e_s between X & Y -3 and the consumer spends 1/10 of his income on X, then e_p or elasticity of demand $-1/10 \times 2$ plus $(1\ 1/10)\ 3$

$-2/10$ plus $27/10 - 29/10 = 2.9$

Therefore elasticity of demand is 2.9 which is greater than one so that demand for X is elastic which means the change in demand is more than proportionate to change in price

Now, If we use the following values, e_i for X is 1 and e_s between X & Y is 1 and 1/4 of the income is spent on X,

e_p $-1/4 \times 1$ plus $(1-1/4)\,1$

$-1/4 \times 1$ plus $3/4 \times 1 = 1$

which means demand is neither elastic nor inelastic or the change in demand is proportionate to the change in price

In this equation the first part, $KX \times e_i$ represents the income effect, i.e. the influence of a rise in income or fall in income on the demand of the consumer for any commodity, and the income effect governs income elasticity, i.e the responsiveness of purchases to changes in income and income effect depends on the proportion of the income spent on a given commodity and in our equation KX stands for that proportion of the income spent on the commodity say X Income effect depends on KX or the proportion of the income spent on commodity X Thus if a large proportion of one's income were spent on X, a fall in the price of X would release sufficient purchasing power to be used for fresh purchases and the smaller the proportion of the income spent on X, the smaller the purchasing power set free to be used on fresh purchases. Further, fresh pur

chases will depend on income elasticity itself Thus this part of our equation $KX \times e_i$ indicates the influence of income effect on price elasticity or elasticity of demand The second part $(1-KX)e$ of the equation represents the substitution effect which governs elasticity of substitution and the influence of elasticity of substitution on price elasticity or elasticity of demand Again when the price of X falls, it will be cheaper relatively to Y and consequently substituted for Y Elasticity of substitution between X & Y i e how much of X would be substituted for Y depends on the extent to which X may be substituted for Y and this further depends on how much Y there is for which X may be substituted This is shown by $(1-KX)$ i e the proportion of the income which is not spent on X, KX being the proportion of the income spent on X Hence $1-KX$ is the proportion spent on Y Thus elasticity of substitution depends upon the amount of X that may be substituted for Y and therefore price elasticity equals income elasticity and elasticity of substitution Price elasticity or elasticity of demand is thus the result of the influence exerted by changes in income and substitution of goods for each other In terms of the concepts income elasticity and elasticity of substitution, one may explain elasticity of demand called price elasticity for different commodities i e these concepts account for variations in the responsiveness of demand to changes in price when elasticity of demand tends to be high for certain goods and low for others For instance, elasticity of demand for necessaries like salt tends to be low while elasticity of demand for goods like radio sets and railway travel tends to be high This may be explained by considering the income elasticity and elasticity of substitution in each case Taking first salt the proportion of the income spent on salt is so little that when the price of salt falls the income released is very little Hence purchasing power set free to purchase more of salt as well as other goods is insignificant Furthermore income elasticity itself in the case of salt is low in as much as enough salt was bought before Hence due to these reasons, income elasticity for salt is low Again elasticity of substitution for salt is also low as there are few good substitutes for salt Consequently both income elasticity and elasticity of substitution being low in the case of

salt, the price elasticity is low or responsiveness of demand for salt to changes in its price is low On the other hand, in the case of commodities such as radios, firstly, being expensive goods a large proportion of one's income is spent on these and when their prices fall, considerable purchasing power is released to be used on fresh purchases Further, having close substitutes such as gramophones and travel by cars, elasticity of substitution in these goods is high so much so that both income elasticity and elasticity of substitution for these commodities being high, their price elasticity is high Thus elasticity of demand is governed by income elasticity and elasticity of substitution

Against the background of our discussion of indifference curves we may now consider the recent development in the theory of choice associated with a few modern economists By means of indifference curves the idea of measuring the utility quantitatively may be dispensed with. The technique of indifference curves provides a method whereby the utilities of commodities is compared and not measured. Thus indifference curves are based on the concept of a scale of preferences and the total utility of different combinations of goods is compared—combinations being either equal in value or significance or different in value or significance. Where combinations are of equal significance they are said to lie on the same indifference curve

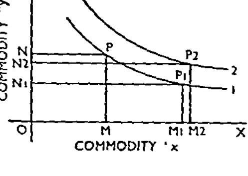


Figure 47

so that one combination has the same amount of total utility as any other combination

Therefore, PN plus PM will be equal to P_1N_1 plus P_1M_1 i e total utility from PN of commodity X and PM of commodity Y equals total utility from P_1N_1 of commodity X and P_1M_1 of commodity Y

Combinations on higher indifference curves yield greater satisfaction than those on lower indifference curves Thus P_2N_2 plus P_2M_2 will yield greater satisfaction than PN plus PM or P_1N_1 plus P_1M_1 In other words a combination on a higher indifference curve is better than any combination on a lower indifference curve Thus combinations along indifference curve 1 signify equal utility so that the consumer is said to be indifferent. But combinations on indifference curve 2 are better than those on indifference curve 1, i e a consumer would prefer combinations on IC_2 to those on IC_1 Thus different collections of goods are compared and one is preferred to others This departure from Marshall's theory of Consumer's choice is attributed to Pareto In Marshall's theory measurability of utility or satisfaction is implicit. In essence according to Prof. Marshall the consumer aims at maximising total utility from a collection of goods by equating marginal utilities of different goods This implies that the consumer first measures the marginal utility of various goods in terms of their money prices in the market and so distributes his income among the different goods that marginal utilities are equal Therefore the idea of being able to measure marginal utility by buying a commodity upto the point where its price is a measure of its utility at the margin is implied in Marshall's theory But measurability of utility marginal or total is questioned by economists such as Prof Wicksteed Robbins Hicks and Pareto By rejecting Marshall's theory, Pareto substituted a new theory of consumer's choice in terms of indifference curves and scales of preferences Pareto borrowed the technique of indifference curves from Edgeworth and expressed choices of consumers in terms of different combinations of commodities which consumers buy in the market To simplify the analysis it is assumed that a buyer with a given income and prices in the market divides his income between two commodities Further the consumer bases his purchase of

goods on his personal tastes expressed in his scale of preferences Thus the behaviour of the consumer with a given scale of preferences under given market conditions is studied geometrically

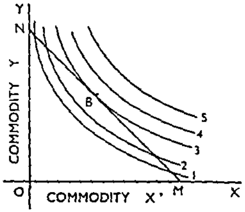


Figure 48

The line *NM* called price line represents market conditions i e. the prices of the goods *X* & *Y*, at which the buyer can buy when he has a given income Thus with his income he could buy *OM* of X or *ON* of *Y* or combinations of *X* & *Y* lying on *NM* and the scale of preferences of the consumer or the tastes of the consumer in regard to the different sets of commodities *X* & *Y* is represented by his indifference map and the equilibrium position of the consumer is determined by the tangent of the price line *NM* and indifference curve viz. curve No 3 "Tangency between price line and an indifference curve is the explanation in terms of indifference curves of the proportionality between the marginal utilities and prices" (Prof Hicks)

Further, according to Prof Marshall the consumer's behaviour in the market could be understood only with a knowledge of the utility of goods to him. *On the other hand* to Pareto the utility of commodities need not be known It is enough if the indifference map of the consumer were known Utility is subjective and therefore cannot be objectively determined while an indifference map by showing the preferences

of consumers between different collections of goods can help one to objectively find out how a consumer would choose The subjective element evident in Marshall's theory in the concept of total utility or intensity of desire of the consumer is not measurable and it is unnecessary to know the intensity of desire of a person If, however, one knows his scale of preferences, one can understand how the consumer would act in a market Marshall is criticised further for his theory of absolute utility i e the relationship of an individual goods to a consumer Pareto, on the other hand, discards absolute utility in favour of relative utility which obtains between different commodities These theories of Pareto which were based on the rejection of a quantitative measurement of utility were further developed by Prof Hicks in England Prof Hicks on the lines of Pareto rejects all quantitative concepts involved in the theory of Consumer's Choice and in their place substitutes concepts which do not involve such quantitative measurements Prof Hicks with the object of making the theory of choice more scientific and less arbitrary eliminates from his theory the concept of Marginal Utility and the concept of Total Utility since both of them are equally arbitrary, total utility being the intensity of desire and marginal utility, the utility of the commodity at the margin measured by Price For the Total Utility or intensity of desire, the scale of preferences is substituted and for Marginal Utility the marginal rate of substitution Thus, by using the concept of marginal rate of substitution the relative utilities of different commodities in terms of each other would be considered whereas if total utility or intensity of desire were involved absolute utility of those would have to be determined Relative utilities of different goods are amenable to a more precise statement than the subjective total utility considered absolutely in the case of each individual

One concept of Marshall in terms of which choices are explained is marginal utility In the place of marginal utility Hicks substitutes marginal rate of substitution This is defined as follows The marginal rate of substitution of X for Y is the quantity of Y which would just compensate the consumer for the loss of a marginal unit of X Further consumer's choice was explained by Marshall in terms of dimi

nishing marginal utility Hicks on the other hand uses the idea of diminishing marginal rate of substitution This is reflected in convex indifference curves Thus, by eliminating absolute utility and measurable utility and replacing them by relative utility which does not involve measurability, Hicks has sought to make the theory of choice less arbitrary and more scientific.

Part Three

MONOPOLY PERFECT COMPETITION AND IMPERFECT COMPETITION

III

MONOPOLY, PERFECT COMPETITION & IMPERFECT COMPETITION

1 EQUILIBRIUM OF FIRM AND INDUSTRY

We shall mainly concern ourselves with the equilibrium of a firm and of an industry under these different situations, i e *Monopoly*, Perfect *Competition and Imperfect Competition* or Monopolistic Competition We have to deal with the policy of a monopolist when he is strong or weak in fixing monopoly price, i e. on what does the power of the monopolist depend? Essentially, one may say that a monopolist is strong or not according as he can or cannot raise his price without losing customers The ability of the monopolist to raise his *price depends on the elasticity of demand for* his product and the elasticity of demand for his product depends on the availability of substitutes and substitutes may be close or distant. The closer the substitutes or the more perfect the substitute *for his product the greater is the elasticity of demand* The more distant the substitutes or the less perfect the substitute the greater the inelasticity of demand The greater the elasticity of demand the less powerful the monopolist is to change the price The *more inelastic the demand the more* powerful is the monopolist to change the price Further, the monopolist's power depends on his control over the supply of the commodity in the market Thus, in the light of these facts the *monopolist can raise the price or not or change the supply* or not.

The monopolist aims at maximising his revenue If he should want to raise his price he might have to reduce his supply *and* sell a *limited amount earning a larger margin of* profit per unit Otherwise, if he prefers to sell a large amount he might earn a smaller margin of profits since a larger stock could be cleared at a lower price. Thus whether

he should restrict his supply or enlarge it depends upon which alternative would yield the largest monopoly revenue How does the monopolist reach this optimum point in his output i e the output which maximises his revenue? The output which is most profitable could be determined if the monopolist knows the demand schedule for his good and thereby the elasticity of demand for his commodity In practice a monopolist can seldom gain accurate knowledge of demand schedule and elasticity of demand Therefore he can only discover the best output by the method of trial and error i e by altering his output and the price correspondingly to reach the optimum In theory we shall assume that the monopolist is armed with accurate knowledge of elasticity of demand on the basis of which he could determine the optimum output. To determine the optimum output the monopolist has to take into account his receipts and his costs If by expanding output he should add to his receipts more than to his costs his profits will increase by expanding output On the other hand by doing so if he should add to his costs more than to his receipts his profits would diminish The monopolist therefore can continue upto the point where he adds equally to his receipts and to his costs i e the addition to his costs is equal to the addition to his receipts

This can be explained by the following example[1] Suppose a carpenter makes 100 chairs and sells them at £ 5 each If he sells 101 chairs the addition to his receipts will be £ 5 Similarly the addition to the costs will be the cost of making one more chair If however the carpenter can sell 100 chairs at £ 5 each but to sell 101 chairs he has to reduce his price uniformly by 6 pence and sell 101 chairs at £ 4-19-6 the increase in his total revenue due to the 101st chair is the total revenue of 101 chairs minus the total revenue of 100 chairs Thus £ 502 9-6 £ 500-0-0 – £ 2 9-6 will be the addition to his total receipts made by an increase in his output Marginal Revenue therefore may be defined as total revenue from "n" units minus total revenue from (n – 1) In our example

n — (n — 1) is 101 — (101 — 1) or 1

Subtracting the total revenue of 100 chairs from the total revenue of 101 chairs we get £ 2 9 6

[1] *Monopoly* E A G Robinson ch I 1952

This is called marginal revenue The size of the marginal revenue depends on the price and the reduction in the price necessary to sell a larger output, and the extent of the fall in price depends on elasticity of demand Thus if the reduction in price were considerable then marginal revenue may become zero or negative, e g if the price of 101 chairs were £4-19-0 then marginal revenue will be—1 Sh. Therefore marginal revenue is negative We may infer from this that if the demand is inelastic the total receipts from selling a larger output will be less than the total receipts from selling a smaller output. If demand is elastic the total receipts from selling a larger output will be greater than the total receipts from selling a smaller output and therefore marginal revenue will be positive If elasticity of demand were equal to 1 or unity, i e demand is neither elastic nor inelastic total receipts from selling a larger output will be the same as those from selling a smaller output so that the marginal revenue will be the same Thus only if demand were elastic it is worthwhile for the monopolist to expand output.

The monopolist can maximise his revenue by equating marginal cost with marginal revenue In our example the marginal revenue was £2-9-6 The monopolist can expand output until the marginal cost rises to £2-9-6 marginal cost being the addition to total cost due to one more unit of the commodity the cost of 1 more chair (the 101st chair) in our example Again marginal cost may be defined as the total cost of "n" units minus the total cost of "n"−1 units Again in our example it would mean the total cost of 101 chairs minus the total cost of 101−1 or 100

The relationship between marginal cost and average cost has significance in the theory of value. If the marginal cost is greater than the current average cost, the average cost rises If the marginal cost is less than the current average cost, the average cost falls If marginal cost and the average cost are equal, the average cost remains constant. This could be illustrated by the example of a cricketer Suppose the average in 5 innings is 20 runs the total would be 100 runs and in the 6th innings if marginal score or additional score is 80 the total will be 180 and the average will be 30 Thus marginal score 80 runs being greater than the average score

20 runs, raises the average score to 30 runs If, however, the score in the 6th innings is 14 runs, then the total for 6 innings will be 114 and the average for 6 innings will be 19 Hence the marginal score 14 runs, being less than the current average 20 runs, lowers the average to 19 runs If the score in the 6th innings were 20, the total will be 120, the average will be 20 and here the marginal score 20 runs being equal to the current average score 20 runs neither raises nor lowers the average score, i e the average remains constant This relationship between the average and the marginal is important in production.

The relationship between the Marginal Cost and Marginal Revenue on which the net profits of the producer depend may be shown in the following tables[1]·

Chairs	Selling Price			Total Revenue			Marginal Revenue		
99	£ 5	0	6	£ 497	9	6	£ 2	11	6
100	5	0	0	500	0	0	2	10	6
101	4	19	6	502	9	6	2	9	6
102	4	19	0	504	18	0	2	8	6

Chairs	Total Cost			Marginal Cost			Total Profits		
99	£ 402	10	0	£ 2	10	0	£ 94	19	6
100	404	19	9	2	9	9	95	0	3
101	407	9	3	2	9	6	95	0	3
102	409	18	6	2	9	3	94	19	6

If we compare these two tables you will observe that when 101 chairs are sold, marginal cost and marginal revenue are equal at £2 9 6 and the total profits are maximum £95 0 3 But when 99 chairs are sold marginal cost is less than marginal revenue and profits are not maximum When 100 chairs are sold still marginal cost is less than marginal revenue But profits are maximum when 101 chairs are sold But since marginal cost is less than marginal revenue for 100 chairs the carpenter can continue to expand his output until marginal cost – marginal revenue When 102 chairs are sold marginal cost exceeds marginal revenue and therefore profits are not maximum This illustration shows that the producer

[1] Ibid

under monopoly will maximise his profits by balancing his *marginal* cost and his marginal revenue.

The same is true of a producer under competition However, unlike under monopoly, under competition, the price is *fixed by the market and not by a single producer* Therefore, a producer under competition can sell more or less at the same price By selling an extra unit the marginal revenue gained will be equal to price For example, the producer under competition can sell 101 chairs at the same price as 100 chairs The marginal revenue therefore from 101 chairs will be the total revenue from 101 chairs minus the total revenue from 101 1=100 chairs The total revenue of 101 chairs at £5 each is £505 The total revenue from 100 chairs at £5 each is 500 and marginal revenue is £505–£500=£5 And the marginal revenue £5=the price £5 Under monopoly marginal revenue from 101 chairs was £2 9 6 while the price of 101 chairs was £4 19 6 each. Therefore Marginal revenue is less than price

But under competition again the producers can expand output till marginal cost equals marginal revenue which=the price Therefore, under monopoly and competition the point of optimum output is where marginal cost and marginal revenue are equal The situation under competition will be illustrated in the following table[1]

Output (in tons)	Total Cost	Total Revenue	Net Revenue	*Marginal Cost* (per ton)
0	200	0	—200	—
5	215	46	—170	3 00
10	225	90	—135	2.00
15	231	135	— 96	1 20
20	237	180	— 57	1.20
25	242	225	— 17	1 00
30	249	270	+ 21	1 40
35	257	315	+ 58	1 60
40	274	360	+ 86	3 40
45	306	405	+ 99	6 40
50	340	450	+110	6 80
55	385	495	+110	9 00
60	430	540	+ 90	13 00
65	535	585	+ 50	17 00
70	644	630	+ 14	21 80

[1] *Economic Analysis*, Kenneth E. Boulding, ch 22. 1951

We base this table on certain assumptions First, the producer is operating under competition Therefore, he can sell any amount at the price in the market Secondly, the price is assumed to be \$9 per ton The commodity is coal The table illustrates the relationship between marginal cost and price under competition and when the two are equal, profits will be maximum In this table, profits are maximum for output between 50 and 55 tons and they are \$110 Only when 55 tons are produced the marginal cost is=the price at \$9 When 50 tons are produced marginal cost is less than price Therefore, there is scope for expansion until marginal cost=price

Summing up the main conclusions of our discussion we say that under monopoly the producer maximises his profits when marginal cost=marginal revenue But under monopoly, since the monopolist can sell more by lowering his price, the marginal revenue is less than price Therefore, under monopoly price is greater than marginal cost and marginal revenue Under competition the producer maximises his revenue when marginal cost=marginal revenue But under competition the producer does not have to lower his price to sell a larger amount He can sell any amount at the same price. Hence price=marginal revenue But marginal revenue=marginal cost Therefore, under competition price=marginal cost and marginal revenue

Perfect Competition

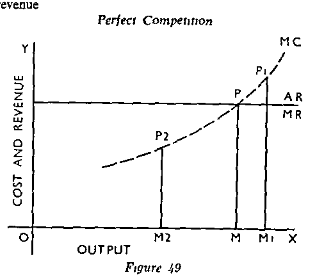


Figure 49

Under perfect competition the optimum output is achieved when marginal cost and marginal revenue are equal Secondly price = marginal cost and marginal revenue Both these conclusions are portrayed by this diagram in which we have marginal cost curve and average revenue or price curve which is the same as the marginal revenue curve We have a straight line horizontal and parallel to OX to represent average revenue and marginal revenue Under perfect competition average revenue and marginal revenue are identical, average revenue being price In perfect competition any amount can be sold by the producer at a given price Since the monopolist has control of the commodity, price varies with the amount whereas under perfect competition the producer takes the price as given and sells whatever he produces The addition made to total revenue will be equal to the price at which it is being sold in the market Under competition there is no difference between marginal revenue and price

Secondly the curve is a straight line under competition showing price as constant Any amount can be sold at this price Thus, the average revenue curve or the price curve in the diagram is also the marginal revenue curve The most profitable output is OM OM output is the best output since for that output marginal cost and marginal revenue are equal This is shown by the Inter section of marginal revenue curve and marginal cost curve at point P i e both marginal cost and marginal revenue are PM PM represents marginal revenue marginal cost and average revenue or price Thus the two conclusions under competition are both seen in our figure above 1 When marginal cost equals marginal revenue, profits are *maximum* i e the optimum output which means the most profitable output of the producer is the one for which marginal cost and marginal revenue are equal In the diagram when output is OM, marginal cost and marginal revenue are equal at PM If output were more than OM say OM_1 then marginal cost will exceed marginal revenue, marginal cost being P_1M_1 and marginal revenue PM Similarly if output were less than OM, say OM_2 then marginal cost will be less than marginal revenue marginal revenue being PM, marginal cost being P_2M_2. Therefore in either case when the output is OM_1 and OM_2, profits will be less than

maximum 2 Under competition, price equals marginal cost and marginal revenue for an optimum output Thus for output *OM* price is *PM* and marginal cost and marginal revenue are also *PM*, since *P* is the point of intersection between marginal revenue curve and marginal cost curve This is the diagrammatic representation of the equilibrium of a firm under competition i e the position of a firm when it earns maximum profits

Similarly we may show monopoly graphically

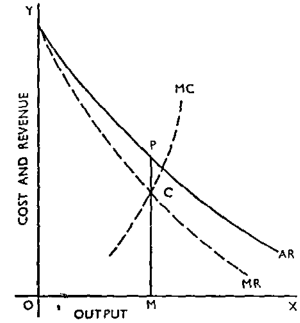


Figure 50

Again, the various relationships between marginal cost and marginal revenue and price are brought out in this diagram showing monopoly Here, unlike in the last diagram, we have two separate curves for average revenue and marginal revenue and the two curves slope downwards to the right The signi

ficance of a downward sloping average revenue curve—*AR* is that under monopoly a larger output can be sold at a lower price Therefore, the average revenue curve slopes downwards to the right. Marginal revenue curve we observe is to the left of the average revenue curve Marginal revenue curve is below average revenue curve showing that marginal revenue (at any point) is less than average revenue or price Further, the marginal revenue curve lies below the average revenue curve since only when marginal revenue is less than average revenue average revenue can fall. What is the marginal revenue in our diagram? It is *CM* *C* being on the marginal revenue curve *CM* represents the marginal revenue when output *OM* and *PM* represents average revenue or price, *P* being on the average revenue curve Therefore *PM* is greater than *CM* i.e price is greater than marginal revenue But marginal revenue=marginal cost. Thus, one of the conclusions under monopoly, looking at the diagram is that price is greater than marginal cost and marginal revenue and marginal cost are equal and the optimum output under monopoly is the one for which marginal cost and marginal revenue are equal. Therefore, *OM* units of output in the diagram will be the optimum because for that output marginal cost and marginal revenue are equal at *CM* This diagram differs from the previous one in that the average revenue curve or the price curve slopes downward to the right and the marginal revenue curve lies below the average revenue curve so that average revenue or price is above marginal revenue

II AVERAGE COST MARGINAL COST RELATIONSHIPS

We shall give tables[1] to show how marginal cost and average cost are related to each other Marginal cost may be defined as the rate at which total cost increases as output increases In other words, the marginal cost *of N units of output is the* total cost of n units minus the total cost of n−1 units Average cost is the total cost of n units divided by n. If we know the average cost of different amounts of output, we may derive the marginal cost. Even so if we know the marginal

[1] *Economics of Imperfect Competition* Joan Robinson ch. 2. 1950

cost of different amounts of output we may derive the average cost.

Units of output.	Average Cost.	Total Cost	Marginal Cost
10	20	200	—
11	21	231	31
12	22	264	33
13	23	299	35

This table shows how marginal cost can be determined when the average cost of various amounts is known Thus from the output and the average cost we can find out the total cost For 10 units total cost is 200 and for 11 units it is 230 so that marginal cost of 11 units is 231−200=31 Therefore marginal cost can thus be determined when the output and corresponding average costs are given In this we are assuming increasing costs Both marginal cost and average cost are rising with increased production We may take figures to show diminishing costs

Units of output	Average Cost	Total Cost	Marginal Cost
10	20	200	—
11	19	209	9
12	18	216	7
13	17	221	5

In this table we have diminishing cost Again we may derive marginal cost from average cost by calculating total cost Further costs may be contstant neither falling nor rising

Units of output	Average Cost	Total Cost	Marginal Cost
10	20	200	—
11	20	220	20
12	20	240	20
13	20	260	20

In this both marginal cost and average cost are equal and consequently costs are constant The first table shows increas-

ing costs and in it marginal costs were above average costs The 2nd table shows diminishing costs and in it marginal costs were below average costs and the 3rd table shows constant costs in which marginal and average costs were equal Therefore, we may again emphasize this important relation ship between the marginal and average as they relate to costs

1 So long as marginal cost is greater than average cost, average cost increases with output. 2 So long as marginal cost is less than average cost, average cost decreases with out put. 3 If marginal cost equals average cost, average cost remains consant.

Now we shall show these relationships between average and marginal costs in the following diagrams

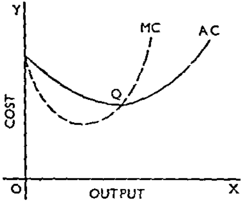


Figure 61

The average cost curve and marginal cost curve slope downwards and subsequently slope upwards When this happens marginal cost curve crosses average cost curve at the lowest point of the average cost curve Now this diagram reflects the 3 relationships between the marginal and the average Thus, upto the point of intersection, the marginal cost curve and average cost curve are sloping downwards to the right and the marginal cost curve is below the average cost curve Once the marginal cost curve gets above the average cost curve which it does when it crosses the average cost curve, the marginal cost curve will be above the average cost curve

Therefore upto this point—Q, as output is expanded costs are diminishing, i e the marginal cost and average cost are falling and as we have seen average cost can fall only when marginal cost is less than average cost At Q both marginal cost and average cost are equal since the two curves intersect at Q But beyond Q as output is increased costs rise, i e marginal cost and average cost increase and average cost can rise only when marginal cost is above average cost Therefore, this diagram illustrates the relationship between the average and marginal costs In this, first the costs fall and subsequently they rise Therefore, the marginal cost curve must cross the average cost curve at the lowest point of the average cost curve because at Q in the diagram when the marginal cost curve crosses the average cost curve, marginal cost exceeds the average cost and therefore, from Q the average cost curve will begin to rise Before Q, marginal cost curve is below average cost curve Therefore, the average cost curve slopes downwards Hence Q marks the lowest point on the average cost curve

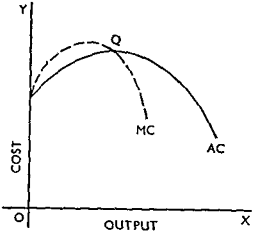


Figure 52

This is a variant of the same type of diagram Q marks the highest point on the average cost curve through which marginal cost curve passes In this we assume costs to rise first

and fall subsequently But the relationship between the average and marginal costs holds good Thus, *upto Q both marginal cost and average cost curves rise* Beyond *Q* they fall and *upto Q the marginal cost curve is above the average cost curve* showing that the average cost can rise only when the *marginal cost is greater than the average cost* Beyond *Q*, the average cost curve and the marginal cost curve both slope *downwards showing that the average cost can fall only when* the marginal cost is less than the average cost. In this dia *gram the marginal cost curve crosses the average cost curve* at the highest point of the average cost curve, *Q* At *Q* the average *cost changes direction Upto Q it rises and from Q* it falls because upto *Q* marginal cost curve is above the average cost *curve* showing marginal cost is greater than average cost Beyond *Q*, marginal cost curve is below the average cost curve showing that average cost diminishes Thus, when costs are first rising and subsequently falling the marginal cost curve will pass through the average cost curve at the highest point of the average cost curve

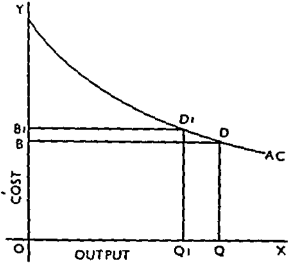


Figure 53

We may derive the marginal cost from average cost diagrammatically We have seen how marginal cost may be deter

mined when average cost and output are known Graphically, we may show how marginal cost may be derived from average cost when we know the slope of the average cost curve

AC is the average cost curve For output *OQ* the average cost is *DQ* Therefore the total cost *OQ* is *ACX* total amount, i e the product of *AC* and the number of units In the figure it is the rectangle *OBDQ* *OBDQ*, therefore, is the total cost for *OQ* output Similarly, the average cost for OQ_1 is D_1Q_1 and the total cost of OQ_1 will be the product of the average cost and total units In other words, D_1Q_1 into OQ_1 or the area of rectangle OBD_1Q_1 Therefore the marginal cost of output *OQ* will be the total cost of *OQ* minus the total cost of OQ_1, i e to say the area of the rectangular *OBDQ* minus the area of the rectangular $OB_1D_1Q_1$ Now how to derive diagrammatically average cost when marginal costs of various outputs are known?

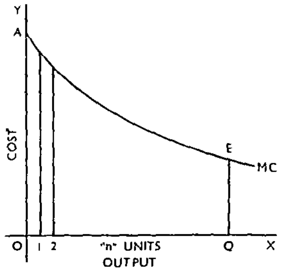


Figure 54

In this *MC* stands for Marginal Cost curve and suppose we have "n" units of a commodity The marginal cost curve

shows the addition to total costs with every increase in output. Total costs, therefore, may be defined as the sum total of marginal costs for each output. Hence the area under the marginal cost curve represents total costs. Thus, in the diagram the cost of one unit is the area under the curve for a unit of output. Therefore, for *OQ* output total cost is shown by the area *AEQO*, i.e. area under the marginal cost curve for *OQ*, i.e. "n" units. Thus, when total cost is *AEQO* and *OQ* or "n" units are produced, average cost will be *AEQO* divided by *OQ* or "n" units. Thus we may derive average cost from the marginal cost graphically.

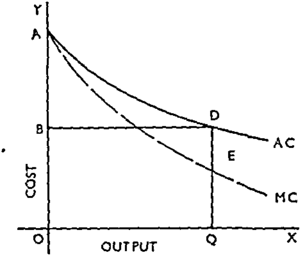


Figure 66

This diagram shows that for a given output *OQ*, the area under the marginal cost curve must be equal to the rectangle *BDQO*. The area under the marginal cost curve for *OQ* is *AEQO* and as we have seen this area *AEQO* represents the total cost of *OQ* output and the rectangle *BDQO* is the product of *DQ* (average cost) and *OQ* (total output) which is the total cost. Hence *AEQO* and *BDQO* are both the total cost of *OQ* output and must, therefore, be equal. From this we may derive certain geometrical relationships between the marginal

cost curve and average cost curve One such relationship is, if the curves, i e marginal and average cost curves, are straight lines, a perpendicular from any point on the average cost curve to the Y axis or OY will be bisected by the marginal cost curve

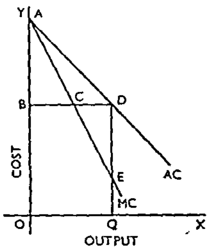


Figure 56

Note Make $BC=CD$ to show MC bisects BD

Construction of the diagram From D on average cost curve draw perpendiculars DB and DQ to OY and OX meeting OY and OX at B & Q respectively Let the average cost and marginal cost curves (AC & MC) meet OY at A Let the marginal cost curve meet BD at C and DQ at E We have now to prove that $BC=CD$, or MC bisects BD We have seen in our last diagram that for a given output the area under the marginal cost curve must equal the rectangle under the average cost curve Therefore, $AEQO$ will be equal to $BDQO$ Hence $AEQO$ minus $BCEQO$ will be equal to $BDQO-$ $BCEQO$ Hence $\triangle$ ABC must be equal to $\triangle$ CDE Further, angle ABC=angle CDE both being right angles Similarly, angle ACB=angle DCE Therefore, the two triangles are equal Hence $BC=CD$ or MC bisects the perpendicular BD

Analysis

$$AEQO = BDQO$$
$$AEQO - BCEQO = BDQO - BCEQO$$
$$\triangle ABC = \triangle CDE$$
$$\angle ABC = \angle CDE$$
$$\angle ACB = \angle DCE$$
$$\angle BAC = \angle CED$$
$$AB = DE$$
$$BC = CD$$

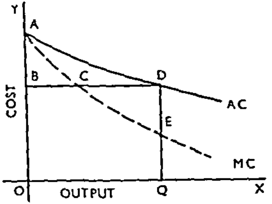


Figure 67

Let AC be the average cost curve with OQ as given out put. The average cost for output OQ is DQ How to deter mine the marginal cost of OQ output? From D draw a perpendicular to OY meeting OY at B From A draw the marginal cost curve bisecting BD at C and meeting DQ at E Then the distance EQ is the marginal cost of output OQ Therefore when we know the average cost, we can find out the marginal cost. There is another way which is simpler of determining the marginal cost when average cost and out put are known

Thus we know the slope of the average cost curve which is made a straight line for convenience and output OQ The average cost of OQ output is as before DQ To find out marginal cost again we erect co-ordinates to meet OY at B

and OX at Q It is not, however, necessary to draw a marginal cost curve bisecting BD at C We can find out the marginal

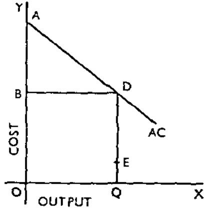


Figure 58

cost without drawing marginal cost curve Thus measure the distance AB and mark off the same distance from D on DQ and EQ will be the marginal cost. This is because the two triangles are equal in area as we have seen in our example Thus, EQ is the marginal cost

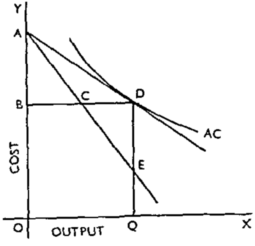


Figure 59

On the assumption of straight line curves, these diagrams were constructed. Suppose the average cost curve is not a straight line but a curve, what then?

OQ is the output and *DQ* the average cost of *OQ* To determine the marginal cost, draw a straight line tangential to *AC* at *D* meeting *OY* at *A* As before, from *D* draw a perpendicular meeting *OY* at *B* Then, either you can draw the marginal cost curve bisecting *BD* at *C* and meeting *DQ* at *E* or measure the distance *AB* and mark off the same distance from *D* on *DQ*, and *EQ* will be the marginal cost.

III. MULTIPLE EQUILIBRIUM UNDER MONOPOLY

We pass on now to consider what is called the Multiple equilibrium of the Monopolist. Till now we assumed a single point where marginal cost and marginal revenue were equal both under competition and monopoly and where marginal cost and marginal revenue were equal, then the firm was in equilibrium. It is quite possible that there may be several points, not just one, where the marginal cost and marginal revenue are equal so that the firm may be in equilibrium by producing different outputs Such a situation is described as Multiple equilibrium, that is to say, a monopolist may be in equilibrium by producing a certain amount. *If he should produce further again at a later stage in expansion he may once again be in equilibrium but the monopolist* having obtained an equilibrium position may not produce further to reach another equilibrium position. Multiple equilibrium is due to various elasticity of demand for the product over different ranges of price Elasticity of demand under given conditions might be reflected in the slope of the demand curve, i.e the steeper the slope the more inelastic the demand and the flatter the slope the more elastic the demand and the slope of a demand curve may change when, over different price ranges, consumers respond differently to changes in price

Here we have a demand curve *DD* which is otherwise called Average Revenue Curve whose slope alters over different ranges of price Thus, over the range *OA* to *OB* i.e as the

price diminishes from *OA* to *OB*, demand is inelastic Over the range *OB* to *OC* the slope of the demand curve is flatter

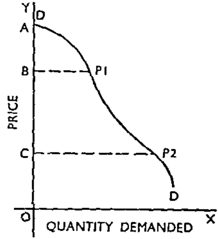


Figure 60

than AP_1, and demand is more elastic But once again below price *OC* demand becomes inelastic as shown by the steeper slope of the curve beyond point P_2 Thus, elasticity of demand may vary when the demand for the commodity comes from different income groups When consumers of a certain income group had not bought the commodity before, they might buy when its price falls and the sales of the firm increase more than proportionate to the fall in the price Thus, a new group of consumers may enter the market when the price is between *OB* and *OC* and add to the total demand Then elasticity of demand changes with price The demand curve will have different slopes When the slope of the demand curve or the average revenue curve tends to be steeper or flatter, the marginal revenue curve will also have different slopes Under monopoly, to sell a larger output, the monopolist must lower his price. By how much he must lower it depends on the elasticity of demand If demand is inelastic, to induce a greater demand, the price reduction must

be appreciable so that there is a fall in the marginal revenue On the other hand if demand is elastic to induce a greater demand a slight reduction in price may be enough Then marginal revenue might not fall so much Thus the slope of the demand curve and of the marginal revenue curve are both governed by the elasticity of demand for a commodity

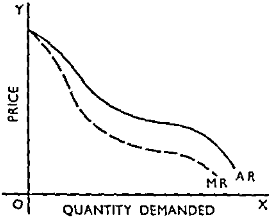


Figure 61

Note Just as the demand curve dips and rises so also marginal revenue curve dips and rises and falls again

Let us go back to Multiple equilibrium and show how multiple equilibrium can be represented by means of these curves the demand curve or average revenue curve and marginal cost curve and marginal revenue curve.

One point should be noted in this diagram and that is the varying slope of the demand curve *AR* and the varying slope of the marginal revenue curve When the demand curve does not have a consistent slope and when the demand curve does not fall steadily due to changing elasticity of demand the marginal revenue curve will have a changing slope because both demand and marginal revenue depend on elasticity of demand in the market

Secondly the marginal revenue curve *MR* and the marginal cost curve *MC* intersect each other at numerous points as at a c e and so on When they intersect the firm is in

equilibrium Each point of intersection denotes equality between marginal cost and marginal revenue When marginal cost and marginal revenue are equal, profits will be maximised or the output is optimum. Thus, at a the producer is in equilibrium, i e to say when output is OM_1, the marginal cost and marginal revenue will be equal, at aM_1

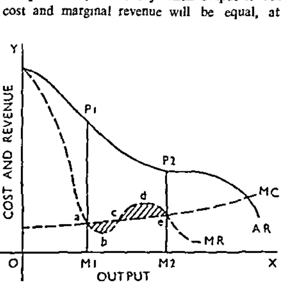


Figure 62

But by expanding further once again a new equilibrium position might be reached as at e by producing OM_2, again marginal cost and marginal revenue may be equal But having reached a by producing OM_1, the monopolist will not proceed further to expand the output unless he knows that he can again reach equilibrium at e when output is OM_2 Multiple equilibrium presupposes knowledge of market conditions and demand schedules for his product on the part of the monopolist.

In this diagram (Fig 63) the slopes of average revenue or demand curve and marginal revenue curve are both steady and fall consistently But the marginal cost curve is seen to change its slope over different ranges of output. The shaded portion represents the net profits of the firm The net profits are derived by subtracting total cost from total revenue In the

diagram total cost is the area under the marginal cost curve and the total revenue, the area under the marginal revenue

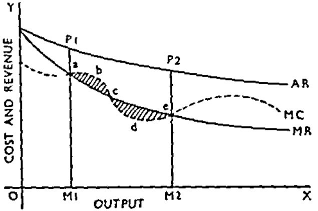


Figure 63

curve The firm will be in equilibrium when marginal cost and marginal revenue are equal, i e when in the diagram *MC* and *MR* intersect. If, by expanding, marginal cost is found to exceed marginal revenue, net profits will diminish. If marginal revenue is found to exceed marginal cost, net profits will increase The firm is in equilibrium at *a* in the diagram, i e when output is OM_1, marginal cost and marginal revenue are equal and profits are maximum Beyond OM_1 when output is expanded, marginal cost exceeds marginal revenue as shown in the diagram, i e the marginal cost curve lies above the marginal revenue curve But again at *c* a new equilibrium is attained when marginal cost and marginal revenue are equal as shown in the diagram, i e the *MC* and *MR* intersect at *c* If there should be further expansion, marginal revenue will exceed marginal cost, i e marginal revenue curve lies above the marginal cost curve Therefore, the monopolist can be in equilibrium at various points but the net profits will be different at different points Thus, net profits for OM_1 will be different from the net profits at OM_1 This situation is called multiple equilibrium of a monopolist when marginal cost varies with output, rising and falling over

different ranges of output as shown by the shape of the marginal cost curve

Before we pass on to Discriminating Monopoly, we shall consider the diagram showing net monopoly revenue of a firm

We may show the monopoly revenue by considering the marginal cost and the marginal revenue curves and the

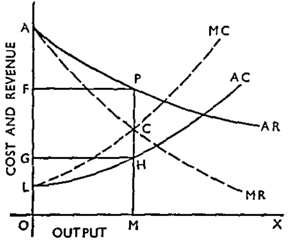


Figure 64

average cost and average revenue curves In the diagram, the marginal cost curve and the marginal revenue curve are broken and the average cost curve and average revenue curve are unbroken First, therefore, taking the marginal cost and marginal revenue curves—*MC* & *MR* the area under the marginal cost curve, MC for *OM* output will be the total cost of *OM* output and the area under the marginal revenue curve for *OM* output will be the total revenue for *OM* output and the net monopoly revenue is total revenue minus total cost i e *ACMO* or the area under the marginal revenue curve for *OM* output minus *LCMO* or the total cost for *OM* output. *ACL* in the diagram, therefore, represents monopoly revenue

Alternatively net monopoly revenue may be derived by considering average revenue curve and average cost curve, i e *AR* & *AC* For output *OM* average revenue is *PM*

Therefore, the total revenue is the product of average revenue *PM* and output *OM* or the rectangle *FPMO*. The average cost of *OM* output is *MH*, *H* being on the Average cost curve. Therefore the total cost of *OM* output will be *MH* x *OM* (*AC* x total output) or *GHMO*. Thus the total revenue *FPMO* minus the total cost *GHMO* is net monopoly revenue, i.e. *FPHG*. Thus the net monopoly revenue for *OM* output when the firm is in equilibrium equals *ACL* & *FPHG*.

IV DISCRIMINATING MONOPOLY

We go on next to Discriminating Monopoly and consider the equilibrium of a monopolist under discriminating monopoly. So far we have assumed that the monopolist has been selling in a single market or at one price. However, a monopolist may sell in several markets at different prices. One condition for price discrimination is that resale of the commodity must be impossible. Thus, if resale were possible then the monopolist cannot practise price discrimination. For instance, if a monopolist sells a ton of his product to *A* at \$10 and to *B* at \$5, if re-sale were possible *B* would buy from the monopolist at \$5 and sell it again to *A* at an intermediate price between \$10 and \$5 so that both *A* & *B* stand to gain thereby, i.e. *B* can earn a profit and *A* can buy from *B* cheaper than from the monopolist. Under these circumstances, two prices cannot rule in the market due to re-sale. Only if re-sale were not possible, due to inaccessibility between two customers of the monopolist, discriminating monopoly will be profitable i.e. only when markets are effectively separated, price discrimination will be worthwhile. Markets may be thus separated by transport costs or freight charges and inertia of consumers to buy from the cheapest market. Therefore, price discrimination may be defined as "the act of selling the same article produced under a single control at different prices to different consumers"[1]. The power to discriminate in this way may vary from discriminating between individuals to discriminating between groups of individuals. In the former case there is no fixed price and the mono-

[1] *Economics of Imperfect Competition*, Joan Robinson, ch 15 1950

polist can sell to each customer, at the price that he can pay, i.e. discrimination is based on bargaining with every customer. Secondly different prices may be charged in different markets as for example in the home market and the foreign market. For instance, transport agencies may sell their services at different freight rates to different classes of clients such as those selling bulky goods and those selling light goods of high value. Assuming that the monopolist can practise price discrimination in different markets, the question that arises is what would be the optimum output of the monopolist which when distributed among different markets and sold at different prices would yield maximum net monopoly revenue? Since the monopolist aims at maximising his profits, how could he do so when faced with numerous markets instead of one? When the monopolist sells in a single market maximum profits are achieved by producing and selling upto the point where marginal cost and marginal revenue are equal. Under discriminating monopoly similarly the monopolist to maximise his profits will sell in each market upto the point where marginal cost and marginal revenue are equal. However, he would sell in each market at a different price depending on the elasticity of demand in that market. Thus if in the home market there was no competition and hence no competing substitutes for his article he would enjoy a larger measure of monopoly power, i.e. he can raise his price without losing customers. In other words demand in the home market in the absence of competition will be inelastic. On the other hand in the export market where he has to take into account substitutes for his commodity demand will be elastic so that his power to raise his price is limited by competition abroad. Thus his price varies from one market to another. However the marginal revenue under discriminating monopoly will tend to be equal in different markets. Otherwise if marginal revenue were higher in one market and lower in another the monopolist can shift his sales from the market where marginal revenue is low to the market where it is high. For instance, suppose in the market at home marginal revenue is \$10 per ton and in the export market it is \$12 per ton. If he sells one ton less in the home market by shifting it to the foreign market and sell one ton more in the foreign market the net monopoly

revenue in the home market will fall by $10 while it will rise in the foreign market by $12 so that between the two markets the net revenue will increase by $2 Further as he sells less and less in the home market due to the transfer, his marginal revenue will rise in the home market as he can sell a decreasing amount at a higher price and his marginal revenue will diminish in the foreign market as he can sell an increasing amount at a diminishing price so that eventually the marginal revenues in the two markets will be equal. Thus under *discriminating monopoly prices will be different in different markets due to differences in elasticity of demand and demand schedules* But marginal revenues will be equal When marginal revenues in different markets are equal the monopolist gains maximum net monopoly revenue This can be illustrated by the following table where we have two distinct markets of the monopolist between which he practises price discrimination[1]

PRICE DISCRIMINATION

(Total sales – *10 tons*)

MARKET No 1										
SALES	1	2	3	4	5	6	7	8	9	Tons
PRICE	18	17	16	15	14	13	12	11	10	$ per ton
Total Revenue	18	34	48	60	70	78	84	88	90	$
Marginal Rev		16	14	12	10	8	6	4	2	$ per ton
MARKET No 2										
SALES	9	8	7	6	5	4	3	2	1	Tons
PRICE	8	12	16	20	24	28	32	36	40	$ per ton.
Total revenue	72	96	112	120	120	112	96	72	40	$
Marginal Rev		*24*	*16*	*8*	*0*	*8*	*16*	*24*	*32*	*$ Per ton*
Total Revenue for both Markets	90	130	160	180	190	190	180	160	130	$

[1] *Economic Analysis* Kenneth E. Boulding ch 25 1951

If we look at this table here, we have two markets 1 & 2 and the total product of the monopolist is 10 tons and this is divided between the two markets Thus, if he sells 1 ton in the first market, he sells 9 tons in the second market and so on Therefore, he sells 10 in both markets Secondly, in both markets marginal revenue will be \$8 when he sells between 5 and 6 in the first and the remaining in the second By distributing 10 tons between the two markets and selling these at the price given, the marginal revenues will be the same in both the markets and the total revenue will be maximum, i e \$190 The monopolist can achieve maximum net monopoly revenue when the marginal revenue in both the markets is the same

In market No 1 he sells 5 to 6 tons at prices \$14 and \$13 and in market No 2 the remaining at \$24 and \$28 the prices and amounts are different but the marginal revenue is the same This is a very simple example to show what happens under discriminating monopoly

Another concept under discriminating monopoly is that of total marginal revenue Total marginal revenue may be defined as the arithmetical average of the marginal revenue in the different markets Thus if in Market A the marginal revenue is \$10 and in B, \$8 the total marginal revenue is the average of the marginal revenues in A & B, i e $\frac{10 \text{ plus } 8}{2}=9$ It should follow, therefore, that if in both the markets the marginal revenue were equal, then the total marginal revenue will be equal to the marginal revenue in each market Thus if in A & B marginal revenues were \$10 the total marginal revenue, the arithmetical average, will be $\frac{10 \text{ plus } 10}{2}=10$ which is the marginal revenue in each of the markets And further in each market the monopolist would sell upto the point where marginal cost=marginal revenue If, therefore, marginal revenue in all the markets is the same, and marginal cost equals marginal revenue in each market the total marginal revenue must be equal to the marginal cost Now our conclusion is that under discriminating monopoly the optimum output yielding maximum profits is one for which total marginal revenue=marginal cost Again we may show this graphi

cally We shall limit the number of markets to two, one, the home market and the other, the export market.

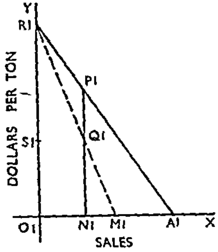


Figure 65

This diagram represents the home market of the monopolist R_1A_1 is the demand curve or average revenue or sales or price curve and R_1M_1 (the broken straight line curve) is the marginal revenue curve O_1N_1 therefore, will be the total sales or total output sold and for O_1N_1 output sold marginal revenue $=Q_1N_1$ We have marked off the same distance Q_1N_1 on O_1Y, i e O_1S_1 Therefore, we may say that marginal revenue for O_1N_1 output is either Q_1N_1 or S_1O_1 and the price at which the monopolist will sell ON_1 is P_1N_1 Incidentally, due to monopoly price P_1N_1 is greater than Q_1N_1 Further, the monopolist realises the best profits in the home market by selling O_1N_1 and earning N_1Q_1 (marginal revenue) since marginal cost will be equal to marginal revenue Q_1N_1 when O_1N_1 is the output sold

The second Market or the Foreign Market is shown in the diagram below:

In the following diagram the price is lower, i e P_2N_2, in the foreign market is lower than P_1N_1 Due to elasticity of demand the monopolist sells at a lower price Again R_2A_2 is

the demand curve or average revenue curve or sales or price curve R_2M_2 is the marginal revenue curve and the mono-

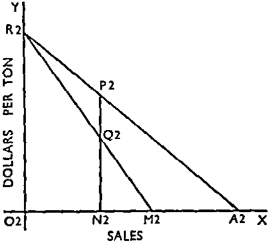


Figure 66

polist sells O_2N_2 output and his marginal revenue is Q_2N_2 and Q_2N_2 is $=Q_1N_1$ in the previous diagram, i e S_1O_1 Therefore, S_1O_1 is marked on the Y axis as a unit of measuring marginal revenue in different markets, i e the marginal revenue Q_1N_1 in the home market and the marginal revenue Q_2N_2 in the foreign market are both equal to S_1O_1 because S_1O_1 is equal to Q_1N_1 Therefore, once again in the foreign market O_2N_2 will be the best output as marginal revenue Q_2N_2 will be equal to the marginal cost. Thus, the marginal revenues are equal in both the markets and they are equal to the marginal cost.

We shall combine these two diagrams to derive the total sales of the monopolist in the two markets

In this diagram $O_3A_3=OA_1$ plus OA_2 from the previous two diagrams for the home and foreign markets Similarly, O_3N_3 is equal to O_1N_1 plus O_2N_2 in the previous two diagrams As before we can get a demand curve or average revenue curve by adding the various quantities bought in the two markets at various prices, i e we can add the two demand schedules for

the two markets and on the basis of the new market schedule, get the demand curve and similarly, to get the marginal re-

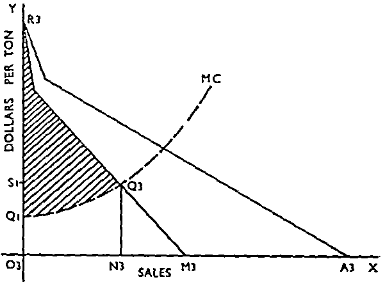


Figure 67

venue curve, we may add up the marginal revenue curves for different volume of sales. The curve R_3A_3 that will result stands for the demand or average revenue.

In this diagram which we may call diagram for the total market, the total output sold will be O_3N_3 which is the sum of the sales in the home and the foreign markets. The marginal revenue in both the markets, home and foreign, being equal to O_1S_1 in the first diagram the total marginal revenue Q_3N_3 in the above diagram will be equal to O_1S_1 in diagram 1. O_3N_3 will be the optimum output as marginal revenue Q_3N_3 in the two markets will equal marginal cost as shown by the marginal cost curve—MC meeting the marginal revenue curve—R_3M_3 at Q_3. The monopoly revenue in both the markets is shown by the area $R_3Q_3Q_1$ which is shaded. $R_3Q_3Q_1$ the shaded area, is equal to the area under the marginal revenue curve—R_3M_3 for O_3N_3 output which is $R_3Q_3N_3O_3$ minus the area under the marginal cost curve for output O_3N_3

which is $Q_1Q_3 N_3O_4$, i e $R_3Q_3N_3O_3$ the total revenue minus $Q_1Q_3N_3O_4$ the total cost Therefore, total revenue minus total cost will be net monopoly revenue

Therefore, in the two markets the monopolist will make profits $R_3Q_1Q_3$ which will be maximum

We shall next deal with a special case of price discrimination Hitherto, we dealt with price discrimination practised by a monopolist between two markets, one at home and the other abroad The elasticity of demand was assumed to be greater in the foreign or the export market than in the home market so that the monopolist faced competition abroad while he enjoyed monopoly at home

In our present discussion we shall again assume perfect competition abroad and monopoly at home What is then the policy of the monopolist in the two markets? In the foreign market under perfect competition, marginal revenue must equal price because the volume of business will not affect the price a larger or smaller amount can be sold at the same price so that an additional unit will add to the total revenue receipts equal to the price in the market because the additional unit can be sold at the same price as before Further, as we have already seen, under price discrimination, a monopolist earns maximum profits from all the markets when the marginal revenue is the same in all the markets In our case of price discrimination the marginal revenue in the home market must equal the marginal revenue in the foreign market But the marginal revenue in the foreign market where perfect competition prevails equal price Hence, the marginal revenue in the home market must equal the price in the foreign market Thus when monopoly exists in one market and competition in the other, for maximum profits, marginal revenue in the market under monopoly will equal the price in the market under perfect competition Further again as we have seen the optimum output under discriminating monopoly, in each market is the one for which marginal cost equals marginal revenue Therefore, in the foreign competitive market marginal cost will be equal to the marginal revenue which is equal to price Similarly the marginal revenue in the home market must equal marginal cost i e the marginal cost in the home market will again be equal to the price

in the foreign market These two conclusions may be shown in the following diagram where the output of the monopolist is divided between the two different markets and sold at different prices, due to differences in elasticity of demand, demand being inelastic in the home market due to absence of competition and demand being perfectly elastic in the foreign market due to perfect competition

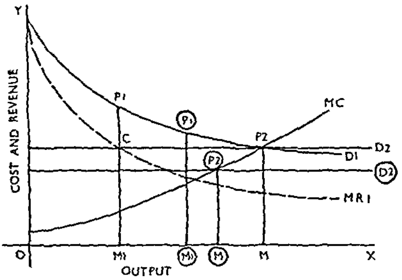


Figure 68

The total output is OM and OM is sold in the domestic *market under monopoly and the foreign market under perfect* competition The demand in the home market is shown by the curve D_1 which is sloping downwards to the right indicating *that to sell* a larger amount, a lower price is being charged The demand in the foreign market is shown by D_2 which is a horizontal straight line parallel to OX indicating perfect *elasticity, i e in the foreign market the monopolist must sell* at the ruling price If he should raise his price he might lose all his customers Further, a horizontal demand curve denotes that *the producer can sell any amount at the same* price MC is the marginal cost curve—the curve which slopes upwards to the right The marginal cost curve cuts the demand

curve $-D_2$ at point P_2 Therefore, marginal cost is P_2M P_2M is also the price or average revenue and the marginal revenue since under perfect competition marginal revenue and price are identical MR_1 is the marginal revenue curve of the monopolist in the home market Marginal revenue curve $-MR_1$ slopes downwards to the right showing that as more and more output is sold at lower and lower prices, marginal revenue diminishes In the home market the monopolist charges P_1M_1 price, P_1 being on the price curve or demand curve $-D_1$ in the home market Further, the marginal revenue curve MR_1 intersects the demand curve $-D_2$ i e the marginal revenue in the home market CM_1 is equal to the marginal revenue P_2M in the foreign market Therefore, the monopolist sells his product in the home market for price P_1M_1 and when he sells OM_1 amount, his marginal revenue will equal the marginal revenue in the foreign market, i e the price in the foreign market P_2M Incidentally, in the home market, price is P_1M_1 and marginal revenue is equal to P_2M and consequently less than the price Since marginal revenue and marginal cost are equal in both the markets and marginal revenue in the home market equals marginal revenue in the foreign market, marginal revenue and marginal cost will be equal in both the markets Therefore, the monopolist sells OM_1 in the home market for P_1M_1 price and M_1M in the foreign market for P_2M price Then the marginal revenues will be equal in both the markets at P_2M and marginal costs will be equal to marginal revenues and the firm is in equilibrium in both the markets

Now suppose there is a fall in the price in the foreign market. This is shown by the shift of the demand curve D_2 nearer OX Thus D_2 (in the circle) shows the shift of the demand curve in the foreign market When the price has fallen the new price is P_2 (in the circle) M (in the circle) Then P_2M in the circle will be the new price and the new marginal revenue in the foreign market the marginal cost curve intersects the new demand curve D_2 (in the circle) at P_2 (in the circle) so that the firm is in equilibrium in the foreign market When the price has fallen in the foreign market and consequently the marginal revenue has fallen in the foreign market, the marginal revenue in the home market must be equal to the marginal revenue in the foreign market The monopolist can

sell a larger output in the home market at a lower price Thus for the marginal revenue in the home market to be equal to P_2M (in the circle) the monopolist will sell OM_1 (in the circle) at P_1M_1 (in the circle) price Then marginal revenue and marginal cost will be equal at P_2M (in the circle) and the firm will be in equilibrium in the home market. As a result of the fall in the price from P_2M to P_2M (in the circle) the total output in both the markets decreases from OM to OM (in the circle) and the output sold in the home market increases from OM_1 to OM_1 (in the circle) Thus previously OM_1 was sold in the home market and M_1M in the foreign market. Subsequently, OM_1 (in the circle) is sold in the home market and M_1M (in the circle) is sold in the foreign market. The opposite effects will follow from a rise in the price in the foreign market.

We shall consider next the consequences of a rise in the price in the foreign market. Let $(D_)$ represent the demand curve and therefore the average revenue and price curve in the foreign market. Then the total output of the monopolist will be $O(M)$ the price in the foreign market will be $(P_1)(M)$ and the amount sold in the foreign market $(M_1)M$ In the home market the price will be $(P_1)(M_1)$, the amount sold $O(M_1)$ and the marginal cost and the marginal revenue in the two markets $(P_2)(M)$ When the price rises from $(P_2)(M)$ to P_2M the demand curve or the average revenue or price curve moves up and therefore the new demand curve in the foreign market is D_2. Then due to a rise in the price in the foreign market the total output increases from $O(M)$ to OM and further when price increases from $(P_2)(M)$ to P_2M in the foreign market, the marginal revenue being identical with price also rises from $(P_2)(M)$ to P_2M and marginal revenue$-P_2M$ will equal marginal cost as shown by P_2 the point of intersection between D_2 the marginal revenue curve and MC the marginal cost curve With a rise in the marginal revenue in the foreign market from $(P_2)(M)$ to P_2M in the home market, under monopoly, the marginal revenue must also rise in order that the marginal revenue may be the same in the two markets so that the monopolist may earn maximum monopoly revenue from all the markets, and in the home market the marginal revenue can rise from $(P_2)(M)$ to P_2M, if output is reduced from $O(M_1)$

to OM_1 and the price is raised from $(P_1)(M)$ to P_1M_1. Therefore when the price in the foreign market rises, the total amount sold between the two markets increases from $O(M)$ to OM, the quantity sold in the foreign market increases from $(M_1)M$ to M_1M and the quantity sold in the home market diminishes from $O(M_1)$ to OM_1.

After this discussion on Price Discrimination by the monopolist between different markets under different conditions of demand we may briefly consider the theory of price discrimination. As we have already seen price discrimination is practised in the sphere of international trade in domestic and foreign markets subject to different states of demand. Therefore a monopolist can charge different prices and by equalising marginal revenues and charging different prices, maximise his monopoly revenue. Even in internal trade when markets are effectively separated differences in price can persist; for example a milk producer in the form of a co-operative can charge different prices to domestic consumers and producers of butter and cheese. Again, even in rendering direct services, different charges may be made as for instance by doctors and lawyers. In transport services railway companies may discriminate between different customers as for instance charging different freight rates for bulky and light goods for expensive and cheap commodities for long and short hauls, for carrying goods in different directions charging one rate to take goods west charging another rate for carrying goods east or charging low rates between points where competition from alternative means of transport such as roads and waterways exists. Not only price discrimination may be practised by a full fledged monopolist but even by a would be monopolist. Price discrimination may be used as a weapon to suppress and eventually eliminate competition in the field i.e. by under selling rivals by charging lower price. Even at the cost of incurring losses firms intending to acquire monopoly power may practise price discrimination. However once competition is eliminated the monopolist could raise the price without fear of losing customers and make up for past losses. It is when intending monopolists practise price discrimination in order to establish monopoly power that price discrimination is resented by rival firms and it is taken as a symptom of growing mono-

poly power and it is regarded as unfair competition and price-cutting

V IMPERFECT COMPETITION

In the Theory of Value yet another situation we must deal with is imperfect competition which is a compromise between the two extremes—pure monopoly and perfect competition. Very seldom pure monopoly or perfect competition exists Thus, in public utilities we have a case of pure monopoly and in raw materials, especially agricultural commodities, perfect competition prevails But, normally in other forms of production, neither pure monopoly nor perfect competition exists Therefore, there is imperfect competition which may assume different forms like monopolistic competition, perfect oligopoly and imperfect oligopoly

We shall discuss each of these various situations

Monopolistic Competition

Under this, many firms in an industry make heterogeneous products However, they are similar to each other but not identical As against monopolistic competition there is perfect oligopoly which consists in a few firms making a homogeneous product and imperfect oligopoly where a few firms sell heterogeneous products Analysing the situation under monopolistic competition, there are a large number of firms so that any one firm has very little influence on the industry as a whole, i e the total supply is not altered by the policy of a single individual firm and further, the price of each firm will have little effect on other firms Another element in monopolistic competition is product-differentiation This is indicated by the definition of monopolistic competition, that is to say the products of various firms in monopolistic competition are not perfect substitutes However, all of them could satisfy a given want. Still, from the point of view of consumers the product of each firm has a distinct character or quality and consumers prefer one product to another Another characteristic of monopolistic competition is the manufacture of goods under different brand names What

is the effect of product differentiation and consequently differences in prices on demand when a single firm alters its own price? When a firm, for example, cuts its price, it can increase its sales to a limited degree and conversely, when it raises its price, it will reduce its sales to a limited degree On the other hand, where there is no product-differentiation as under imperfect competition, when a firm lowers its price, its sales may increase infinitely and when it raises its price, its sales may fall infinitely

Thus a number of firms under monopolistic competition sell slightly different commodities The influence of an individual firm on the sales of other firms is limited unlike under perfect competition. Suppose there are four firms *A*, *B*, *C* & *D* All of them engage in monopolistic competition. Suppose *A*'s price is \$10 per ton If it raises its price to \$11, *A* would lose some customers who would buy from others However, not all customers of *A* would desert *A* For example, if *A* were selling at \$10 to a 1000 customers at \$11 he would sell to 800 customers, i e 200 customers would be buying from other firms Similarly, at \$12 *A* might retain 500 customers On the other hand, if *A* should reduce the price to \$9 per ton, *A* would attract customers from other firms Even then, *A* would not attract all the customers of *B*, *C* & *D* but some customers The example given illustrates the limited power of the producer under monopolistic competition to raise and lower his price

Product-differentiation may be due to the reputation, the environment, the personal relationship between the firm and the consumer and the distance Of these, the factor of distance causes considerable difference in the cost of the commodity and its price To illustrate the effect of distance on cost and price, we may take two firms producing a commodity at the same cost in their factories[1] However, when due to difference in the distance to the market, cost of transport differs for the two firms there is a redistribution of the consumers buying the products from the two firms, between the two firms

[1] *Economic Analysis*, Kenneth E Boulding ch 27 1951

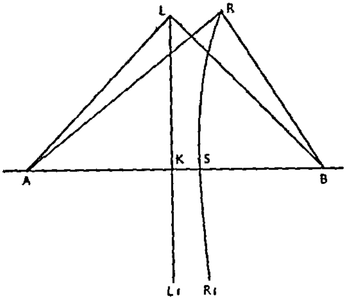


Figure 69

Note: LKL_1 bisects AB so that K is equidistant from A & B. The distance is 50 miles from A to K and K to B. AK and KB are equal in length, in other words.

This diagram is based on a few assumptions.

1. The cost of the commodity is the same both in A & B, i.e. \$10 and the cost of transport is 1 cent per ton mile. Therefore, K being equidistant from A & B, a consumer at K will have to pay for the product of A \$10.50 cents and for the product of B \$10.50 so much so that the consumer at K is said to be indifferent between the products of A & B. However, consumers to the left of K will prefer the product of A and consumers to the right of K, the product of B as it is cheaper due to lower cost of transport. Thus, on the dividing line LKL_1 all the consumers being equidistant from A & B will have no preference for A or B so that they buy A's or B's product. But consumers to the left of LKL_1 are a special preserve of A and, similarly, consumers to the right of LKL_1 are a special preserve of B. Now, suppose the factory price of A is \$9.80 and that of B \$10 as before. Then at K the price of A's product will be \$10.30 whereas the price of B's

product will be \$10.50 so that at K consumers are no longer indifferent between A & B but prefer the product of A to that of B, A being cheaper than B However, once again there is a boundary dividing AB on which all the consumers will be indifferent between A & B The new boundary, separating A's market and B's market, is a hyperbola and not a straight line like LKL_1 Therefore, now at S a consumer is indifferent between A & B, since at S the price of both A & B is the same because the price of A will be 9 80 plus 60 = \$10 40 and the price of B at S will be \$10 plus 40 = \$10 40 At S, therefore, the price of both A & B will be the same Consequently, consumers at S will be indifferent between A & B and consumers along the new boundary will have to pay the same price for the products of both A & B and they are therefore indifferent. However, as before, consumers to the left of RSR_1 will be A's customers and those to the right of RSR_1 will be B's customers As a result of a fall in the factory price of A from \$10 to \$9 80 A has gained some of B's customers These are the new customers between the two boundaries LKL_1 and RSR_1 Suppose the distance AR is 80 miles and RB, 60 miles Then at R the price of both A & B will be the same, i e \$10 60 Similarly, if we take any point along RSR_1, at that point customers must pay the same price for the product of A as well as that of B and, therefore they will be indifferent between A & B ($AR-RB$=20 mls or $2KS$-20 mls) The significance of this is that at any point on the hyperbola RSR_1 if the factory price is the same, due to transport charges the prices tend to be the same along the boundary and they are indifferent

When in the case of B there is a fall in the price of B to \$9 80 as in the case of A, the boundary will be the same as before In other words, customers along LKL_1 will be indifferent between A & B and A cannot gain any customers from B This example further shows how under monopolistic competition due to differentiation in products caused by the factor of distance, each producer has a group of customers buying from him and how if he changes his price the size of his market will change

In connection with monopolistic competition there is another important proposition, i e assuming freedom of entry in an

industry, under monopolistic competition in the long run profits must be normal, normal profits being that level of profits at which there is no tendency for new firms to enter the industry or for old firms to leave the industry When profits are above normal new firms are attracted into the industry, while if profits are below normal, the marginal firms will leave the industry When profits are above normal and new firms enter, the total output will increase and prices will fall and hence profits will fall and become normal again. When profits are below normal and firms leave the industry, output is reduced prices rise and profits rise to the normal level. Thus when profits are at the normal level, neither new firms come in nor old firms go out. This is true of perfect competition and monopolistic competition. But however, under monopolistic competition when profits are not normal so that firms enter or leave, the changes in output will cause changes in prices of different firms For example, when profits are abnormal and the number of firms increases the price of each firm for its product may be depressed because there is no one price for the industry as a whole but as many prices as there are firms

Under perfect competition when one price rules in the market, changes in output would alter the price which is common to all the firms When profits are thus normal and the number of firms remains constant, the industry is said to be in full equilibrium. Further, under perfect competition, since price is given a firm can sell as much as it likes at that price

But under monopolistic competition a firm has to vary its price with its output so that a larger output can be sold at a lower price and hence the marginal revenue would diminish with every increase in output so that expansion of production in a firm, under monopolistic competition, is limited by diminishing revenue Secondly, expansion in production is also limited by the rise in marginal cost.

On the other hand under perfect competition marginal revenue does not decrease as output is increased But as output is increased marginal cost will rise and exceed the marginal revenue reducing the net revenue Therefore, the producer under perfect competition can expand his output as long as his marginal cost is less than marginal revenue or price Under perfect competition, further, the producer can expand output

until his average cost is at a minimum beyond which if he expands any further, marginal cost will overtake or exceed his marginal revenue or price

Under monopolistic competition, the producer will be in equilibrium when his marginal cost and marginal revenue are equal But at this point his average cost may not be at a minimum i e if he should expand his output further, he can still produce at a diminishing average cost But his net revenue will fall as his marginal revenue will fall due to reduction in the price necessitated by increased output Hence a producer under monopolistic competition can be in equilibrium even when his average cost is not the lowest.

Normal Profits and Monopolistic Competition

We shall illustrate normal profits under monopolistic competition by taking the example of a retailing industry in which numerous firms are engaged in selling a commodity but charging different prices as the products of the various firms will be different from each other[1] In such an industry if profits depart from the normal the number of firms would change Thus, when profits are below normal some firms would leave and the number diminishes If profits are above normal some firms will enter the industry so that profits again will return to normal The change in the market from the side of demand will change the price in each firm in monopolistic competition so that the demand curve or the supply curve would shift

Under perfect competition, price being common to all the firms changes in supply can be shown by changing the position of the supply curve for the industry as a whole and therefore the prices of the industry

Since, however under monopolistic competition each firm has a price of its own there is a change in the price in the case of each firm when abnormal profits attract new firms and profits below normal drive out firms As an example of retail trade composed of several firms which are affected by changes in profits we may take a series of firms *A,B C & D* and examine the position of each firm when the price and the demand for its product change in the market

[1] Ibid

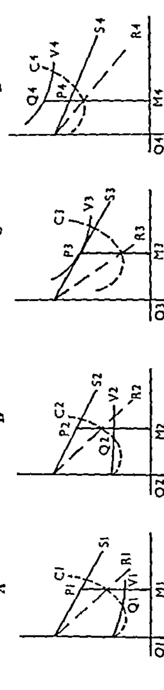


Figure 70

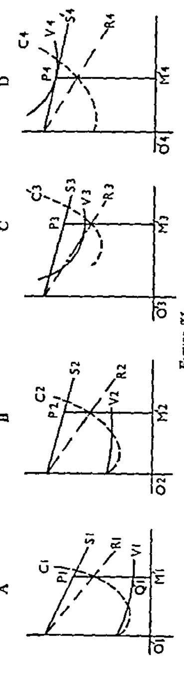


Figure 71

First let us take up the first set of diagrams A,B,C,D (Fig 70) each representing one firm and in all these the broken curve C is the marginal cost curve The dotted curve R is the Marginal Revenue Curve and the solid curve S is the demand or average revenue or Sales Curve and the solid curve V is the Average Variable Cost Curve There are thus 4 firms A,B,C & D Firms A & B make profits above the normal since their prices exceed their average costs For A the price is P_1M_1 while the average cost is Q_1M_1 From P_1Q_1 draw a horizontal line to meet the Y axis This rectangle represents the abnormal profits earned by A The bigger rectangle will be the total revenue while the smaller rectangle will be the total cost Total revenue minus total cost will be abnormal profits

In B price is P_2M_2 and average cost is Q_2M_2 so that price exceeds average cost and the firm, therefore, enjoys abnormal profits But in the case of firm C, price is P_3M_3 and average cost is P_3M_3 because the average cost curve V_3 and the average revenue curve S_3 both touch each other at P_3 so that in the case of firm C, profits will be normal and, therefore, there is no rectangle as in the case of A & B In the case of D price is P_4M_4 and the average cost Q_4M_4 Hence Price is below average cost The firm cannot be in the industry as its costs exceed its revenue Now, therefore, these are the four firms $A,B,C\,D$, A & B earning profits above normal and C earning normal profits while D will not be in the industry

Let us turn to the second set of diagrams (Fig 71) which again represent the four firms $A\ B,C,D$ However, in the case of the 2nd set of diagrams there is a change in demand shown by a shift of the demand curve in each case which means that each firm now sells a larger amount or each firm will sell the same amount at a higher price Thus A will sell $O'_1\ M'_1$ out put instead of O_1M_1 and it will sell at price $P'_1\ M'_1$ instead of P_1M_1 Similarly, firms B, C & D will have increased sales Consequently, each firm will now earn more profits than be fore Thus A will earn a large amount of abnormal profits shown by the larger rectangle Similarly, B will earn more profits than before and C which had normal profits previously will now earn profits above the normal Thus, in the case of

C now there is a rectangle which was not there before and firm D which was not in the industry previously will now enter the industry as it can make normal profits shown by the tangent P_4 for the firm D

In the case of each of the firms, A & B in the first instance. (Fig 70) marginal cost and marginal revenue are equal. Therefore, they are both in individual equilibrium, that is to say in the case of A, O_1M_1 and in the case of B, O_2M_2 will be the best or most profitable outputs But in either case, i e in the case of A & B, average revenue is greater than average cost, i e P_1M_1 is greater than Q_1M_1 and P_2M_2 is greater than Q_2M_2 respectively But in the case of C marginal cost and marginal revenue are equal and average cost and average revenue are equal at P_3M_3

Thus, in an industry when the marginal cost and marginal revenue are equal, and average cost and average revenue are equal, the industry *is in* full equilibrium.

When the industry is in full equilibrium, profits are normal so that the number of firms will be constant.

Therefore, two conditions are necessary for full equilibrium of an industry and they are 1 Marginal cost must equal marginal revenue and 2 Average cost must equal average revenue When both these are fulfilled the industry will be in equilibrium which means profits are normal and when profits are normal the number of firms will tend to be constant. New firms will not have any attraction to the industry and old firms will not leave the industry

We can illustrate these by the following diagrams (Fig. 72)

VI EQUILIBRIUM UNDER PERFECT COMPETITION

In the next two diagrams we shall show the equilibrium of a firm under perfect competition (Fig 73)

In this diagram, the firm is operating under perfect competition, MC is the marginal cost curve, AC the average cost curve, the horizontal straight line the Average revenue curve But since Average revenue or price and marginal revenue are equal under perfect competition, the price curve and the marginal revenue curve are one and the same Therefore, the

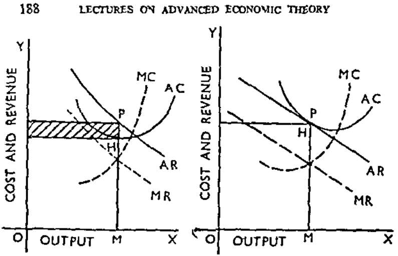


Figure 72

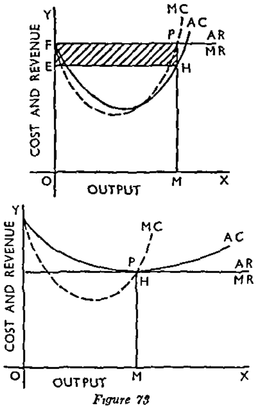


Figure 73

straight line is both average revenue and marginal revenue curve When output is OM the firm is in individual equilibrium since marginal cost and marginal revenue are PM as the marginal revenue and marginal cost curves intersect at point P However, average revenue PM is greater than average cost HM so that the firm earns abnormal profits shown by the rectangle In this we observe that marginal revenue= price, marginal revenue=marginal cost and consequently price=marginal cost. But price is not equal to average cost. It is above average cost so that abnormal profits are made and; consequently, the industry is not in equilibrium

The next diagram shows the full equilibrium of an industry under competition

P is the lowest point on the Average cost curve

In this as before, MC is the marginal cost curve, AC is the average cost curve, the horizontal straight line, the average revenue and marginal revenue curve Output is OM and price is PM and profits will be normal so that the industry is in full equilibrium and marginal revenue equals price PM Marginal revenue equals marginal cost$-PM$ Therefore, price equals Marginal cost=PM, and price equals average cost, again at PM and marginal cost=average cost at PM Therefore, in these two diagrams AR is the average revenue or sales or demand curve and MR the marginal revenue curve. AC the average cost curve, MC, marginal cost curve OM is the output, PM the price at which OM can be sold and HM is the average cost. We will notice that marginal cost and marginal revenue curves intersect at H through which price line passes showing that marginal cost and marginal revenue are equal. Hence the firm is in individual equilibrium, i e when the firm produces OM output, marginal cost and marginal revenue are equal. However, the average revenue PM, i e price is higher than HM, the average cost. Therefore, average revenue and average cost are not equal. Average revenue exceeds average cost. Only one of the two conditions is fulfilled namely marginal cost equals marginal revenue but not the other, so that the firm earns abnormal profits shown by the shaded rectangle.

The rectangle $FPMO$ is the total revenue and the rectangle $EHMO$ is the total cost. If from total revenue total cost is

deducted we get the abnormal profits Therefore, when abnormal profits are made, the industry is not in equilibrium but only the firm is in equilibrium The industry will be in equilibrium when profits are normal and profits will be normal when average revenue and average cost are equal Thus, in the second figure both the conditions are fulfilled i e marginal cost and marginal revenue are equal and average cost and average revenue are equal so that *H* & *P* will coincide at the tangent of the average revenue curve and average cost curve, i e *PM* price equals *HM* average cost so that in the second figure the rectangle showing abnormal profits will disappear Therefore, when the firm is making normal profits, the industry will be in equilibrium Thus, in another way we may describe full equilibrium by saying that an industry is in full equilibrium when the individual demand curve, i e average revenue curve is a tangent to the average cost curve, i e to say demand curve and average cost curve touch each other at *P*

We shall now examine the proposition that under perfect competition a firm can expand production until its average cost is minimum Under perfect competition marginal revenue will equal price But marginal revenue will equal marginal cost when the firm produces the best output Therefore price equals marginal cost But under perfect competition when there is full equilibrium, price must equal average cost Therefore marginal cost must equal average cost and marginal cost equals average cost when it is at a minimum Therefore under perfect competition a firm will reach the optimum output when the average cost of the firm is at a minimum If the firm should expand its output beyond the point when the average cost is at a minimum the profits of the firm will begin to fall

In the second diagram the firm would maximise its profits when it produces *OM* output and at this stage in its expansion average cost is the lowest and when the average cost is the lowest the marginal cost and average cost are equal at *PM*

We shall sum up our discussion on Perfect Competition and Imperfect Competition and how an industry or a firm in an industry achieves equilibrium Let us consider first Imperfect Competition If there should be free entry and if demand were to increase price will exceed cost and, therefore, profits above

the normal are made which would attract new firms into the industry which would compete with the existing firms for the market and thus bring down profits to the normal. If profits are to remain above normal, then there will not be free entry either due to natural or artificial barriers. Then the industry would enjoy monopoly profit so that it will continue to have profits above normal. However, if there should be freedom of entry and firms do enter, even then, due to differences in the products although the prices charged may be less, still the new firms cannot attract all the customers from the existing firms. Thus, due to product-differentiation the market is shared by various firms and, inspite of differences, in prices, movement of customers from firm to firm will be restricted. In an industry composed of a group of firms, the industry will be in equilibrium when at a given price the total output neither tends to expand nor contract. If, however, the output alters, say expands, it can do so if the outputs of individual firms expand or if new firms enter the industry and add to the total output or because of both these reasons. Hence there are two conditions in equilibrium (1) Each firm shall be in equilibrium such that there is no tendency for it to expand or contract. (2) The firms shall make such profits that the total number of firms in the industry remains constant. To fulfill the first condition, a firm must equalise its marginal cost and Marginal Revenue and at that point in output the total net profits of the firm will be maximum. The second condition will be fulfilled when the profits are normal. Profits will be normal when Average Cost equals Average Revenue or price. Therefore, under conditions of free entry, the industry will be in full equilibrium when Marginal Revenue=Marginal Cost and Average Revenue=Average Cost. These two conditions are not present always. The first condition may be present. But the second condition may be absent. When this happens, profits will be above normal or monopoly profits will accrue to the industry. Hence under monopoly full equilibrium will not exist as new firms cannot enter so that the existing firms will enjoy abnormal monopoly profits as price or Average Revenue will be above Average Cost. Under Perfect Competition, Marginal Revenue will equal price. But Marginal Revenue will equal Marginal Cost. There-

fore, Marginal Cost must equal price But in Perfect Competition, when the industry is in full equilibrium, price will equal Average Cost, i e Average Revenue=Average Cost Therefore, under Perfect Competition Average Cost must be equal to Marginal Cost and Average Cost will be equal to Marginal Cost when the Average Cost is at a minimum Thus, when the Average and the Marginal costs are equal as under Perfect competition, then such a firm is of the optimum size Under Imperfect competition or monopoly Average Cost and Marginal Cost are not equal i e the Average cost will not be at a minimum, because a firm under monopoly can sell a larger output by reducing its price so that the Marginal Revenue diminishes and as a result the total revenue would diminish and the firm by continuing expansion until it minimises its Average Cost might earn monopoly revenue below maximum The firm under monopoly or imperfect competition might, therefore, stop further expansion, even when its Average Cost continues to fall Therefore, under monopoly or Imperfect Competition as the Average Cost need not be the lowest when the firm is in equilibrium, the size of the firm will not be optimum

VII OLIGOPOLY AND DUOPOLY

Perfect

In Imperfect Competition we included monopolistic competition and oligopoly We have finished monopolistic competition and next we have oligopoly which has two forms viz Perfect Oligopoly wherein there are a few firms producing a homogeneous product and Imperfect Oligopoly wherein there are a few firms producing heterogeneous products The peculiarity of oligopoly is the limited number of producers or sellers Thus oligopoly differs from monopoly where there is a single producer and perfect competition and monopolistic competition wherein there are a large number of firms The simplest form of oligopoly is duopoly with two firms The study of duopoly illustrates conditions in oligopoly In practice though duopoly in any industry may be uncommon still the problems in oligopoly would be similar to those in duo

poly Hence, a study of duopoly would cover the ground covered by oligopoly First, therefore, to study Perfect Oligopoly which is characterised by homogeneous products, we must study two firms producing identical commodities and selling in the market. In conditions of duopoly the price-output policy of one firm will affect that of the other For example, if one firm should change its price, the second firm would be compelled to change its price and as a result once again the first firm changes its price and so on. Thus, there is a chain of reactions set afoot and the two firms will retaliate and thus affect each other This, however, is not true of Monopoly and Perfect Competition In Monopoly, the monopolist is independent in asmuch as he can shape his own business policy without taking into account the reactions of rivals, rivals of a monopolist being producers producing distant substitutes for the product of the monopolist. Hence the monopolist without fear of retaliation can alter his own price or output. In Perfect Competition, the producer being one among many cannot appreciably affect the total output in the market by altering his own output and, further, the producer under perfect competition sells at the price fixed by market forces As a result, therefore, the monopolist and the competitive producer need not consider the policy of rivals In duopoly and oligopoly, on the other hand, a firm or producer is not thus immune to the change in the policy of other firms Suppose *A* & *B*, two producers in duopoly, make an identical commodity Then, neither of them can ignore the policy of the other Therefore, in regard to oligopoly illustrated by duopoly, fixing of price by a firm becomes a difficult problem In order to simplify our analysis, we shall make some assumptions such as on the side of supply, the two rival firms are equally efficient. In other words, costs of production of the two producers are identical or approximately equal Secondly, the two producers, owning the firms, are of equal intelligence On the side of demand, however, it would be more difficult to make assumptions about the relationship between price and demand, in the case of duopoly or oligopoly, i e in duopoly or oligopoly, it is difficult to determine the shape of the Average Revenue or price or demand curve In the case of monopoly, however, the Average Revenue Curve

may be known, i e the monopolist can determine demand price relationships Again, in Perfect Competition where the price is given and the producer could sell any amount at a price, the producer knows how far he can continue to expand output and sell in the market, the expansion of output being limited by the rise in costs But in duopoly when A & B are both producing an identical commodity at the same cost of production and selling at a given price, consumers would be indifferent between products of A & B Therefore it is not possible to say what would be the sales of A & B Therefore in oligopoly and duopoly which is a variant of oligopoly, the Average Revenue curve or the Demand curve is difficult to determine Now the question as to who will first fix his price would arise? Thus A would wait for B to fix the price and even so B would wait for A to fix the price and so on Therefore, price determination will involve difficulties due to the mutual reactions of the firms Again assuming that the firms eventually hit upon a price what should be the price that would maximise their profits The prices that are fixed by the two producers may be the result of mutual agreement or the result of independent experiments or the result of a price-war or price cutting by both firms in reply to each other However, the price which might yield maximum profits will be the one which the monopolist might charge if he were to produce the outputs of the two duopolists Such a price (the monopoly price) in the case of monopoly would maximise profits Any other price charged would lessen profits Therefore if the duopolists were both to sell at the monopoly price arrived at through agreement or otherwise, their total profits would be maximum and the share of each in the total profits will be maximum Therefore one fact which emerges from this is that the probable monopoly price would be the optimum price which would maximise their profits However if one of the two firms say A were to undersell B by cutting his price, B would be obliged to retaliate so that A as well as B would be getting less than maximum profits Thus it is not in the interests of A & B to raise or lower their prices in order to earn at the expense of each other Obviously if A were to raise his price, he would lose his customers If he were to lower his price B would cut even more There-

fore, it would be short sighted for *A* or *B* to indulge in such a price-war If, however, *B* were more intelligent than *A* if *A* cuts his price, *B* would make an identical cut so that *A* might not retaliate any further But in any event, such price-cuts, whether identical or otherwise, should reduce their profits until they earn normal profits If the firms should continue their price war by changing lower and lower prices, profits will sink below normal compelling the firms to close down To avoid such a disaster and further to earn maximum profits the firms should hit upon the monopoly price which would be the optimum price In the long run the price in duopoly would, therefore, range between the monopoly price and the competitive price, the monopoly price yielding maximum profits and the competitive price normal profits and any price above the competitive price yielding abnormal profits In the short run, if firms continue to reduce their prices, the price would fall below the competitive price and profits will be sub-normal When profits in the long run under duopoly are normal, then the industry would be in equilibrium and, therefore, it may be compared to an industry under perfect competition earning normal profits One difference between the equilibrium of duopoly and perfect competition is that in duopoly when profits are just normal, it may be due to unnecessary price-war between the rivals In Perfect Competition normal profits are due to forces of supply and demand operating in the market. An analysis of duopoly indicates problems connected with pricing of goods under oligopoly. Under oligopoly, therefore, the price must be the monopoly price arrived at through mutual agreement or independent policies which may ultimately coincide But where there are more than two firms in oligopoly, it would be harder to arrive at an agreed solution. Further, if firms in Oligopoly numbering more than two are to reach a harmoneous agreement through independent action, the likelihood of eventual agreement would be even more remote than under duopoly, that is to say, although problems of oligopoly may be essentially similar to those of duopoly, they would be more complex as a result of the greater number of firms

Imperfect

We shall next pass on to Imperfect Oligopoly which is one form of Imperfect Competition In imperfect oligopoly there are a few firms making heterogeneous commodities which are close substitutes The products of different firms differ from each other so that each firm would have a clientele or a group of customers patronising it Thus prices may differ between firms so that one firm may sell at a higher price and still retain its customers due to the preferences of customers for the products of certain firms Under imperfect oligopoly the simplest form is duopoly consisting of two firms producing different products Problems of duopoly are similar to those of oligo poly Hence a study of duopoly in imperfect oligopoly indicates the problems involved in regard to price and output Imperfect oligopoly differs from perfect oligopoly In Perfect Oligopoly assuming the form of duopoly firms *A* & *B* would both offer identical commodities so that their prices must be identical If *A* should charge a lower price *B* would cut his price and in reply *A* would still further cut his price resulting in a price war Therefore in Perfect Oligopoly in the form of duopoly firms cannot sell their goods at the expense of their rivals In other words firms are interdependent and act and react on each other when they change their policies In Imperfect oligopoly once again in the form of duopoly *A* & *B* would produce different goods and have different sets of clients Inspite of price-differences they may both survive side by side In these circumstances when already prices differ a change of price will not affect sales and profits Thus the danger of price war or price-cut is less in imperfect oligopoly The equilibrium of firms would be different however in perfect and imperfect oligopoly This can be shown graphically as follows

We may recall that in Oligopoly the price will range between the monopoly price which is the best price and the competitive price which is the result of price cutting by various firms under duopoly As a result of price war the price falls to *OP* which is the ultimate result of mutual price cutting Therefore Price *OP* yields normal profits If the price should fall below *OP* that is to say if a firm should sell at less than *OP* in the long run it will go out of business since *OP* is the

PERFECT OLIGOPOLY

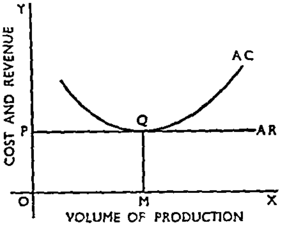


Figure 74

Average Cost. On the other hand, if the firm should charge a price above *OP* in Perfect Oligopoly customers will leave the firm since the identical commodity can be had cheaper from other firms. The firm further will be selling *OM* output at *OP* price and earning normal profits as Average Revenue or price, viz. *OP* or *QM* will be equal to the Average Cost, i.e. *Q* is the point of tangency between the Average Revenue or Price Curve and the Average Cost Curve. The Average Revenue or Price Curve is a horizontal straight line showing that in Perfect Oligopoly where the firms share the market and sell at one uniform price, a larger or a smaller amount could be sold at that price. However, the firm expands its output until its Average Cost is the lowest. In the diagram *Q* is the lowest point of the Average Cost Curve. Thus the firm will produce upto *OM* until the minimum Average Cost is reached and thus make maximum profits. Thus, the firm will be in equilibrium when it sells *OM* amount at *OP* price producing at an Average Cost of *QM* or *OP*.

This figure represents a firm under imperfect oligopoly in which there is no one uniform price for the products of different firms. There may be as many prices as products and as in monopoly each producer has power over supply and price, i.e.

IMPERFECT OLIGOPOLY

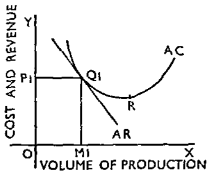


Figure 75

he could sell more at a lower price and sell at a higher price a smaller amount Thus, the Average Revenue or Price Curve slopes downwards to the right showing that larger amounts can be sold at lower prices than at higher prices The firm further can earn normal profits by selling O_1M_1 amount at price O_1P_1 The Average Cost curve touches the Average Revenue Curve at Q_1 Therefore, the price or Average Revenue and the Average Cost being equal, profits are normal However, the Average Cost is not at a minimum shown by the fact that Q_1 is not at the lowest point of the Average Cost curve This is significant as it shows the equilibrium of a producer under Imperfect Oligopoly which is different from that of a producer under Perfect Oligopoly In Imperfect Oligopoly as in Monopoly, the Average Revenue or Price Curve is not horizontal but it slopes downwards to the right Hence to sell a larger output the price has to be reduced so that Marginal Revenue will decrease and eventually the total net revenue of the producer will fall from the maximum In Perfect Competition and in Perfect Oligopoly where the Average Revenue or Price Curve is horizontal, larger sales do not involve the lowering of the price so that marginal revenue does not fall Hence the only limitation on the expansion of output is rising costs The producer, therefore, can expand output so long as the Average Cost falls and equals Average Revenue or Price When the Average Cost overtakes the Average Revenue, pro-

fits will fall from the maximum In Imperfect Oligopoly and Monopoly, limitations on expansion are two (1) Rising Costs (2) *falling revenues Therefore the producer cannot* expand his output till the Average Cost reaches the minimum because of falling marginal and total revenues The producer will stop expansion when his Marginal Cost and Marginal Revenue are equal At this point, however, the Average Cost may not be *minimum Thus, the producer in Imperfect Oligopoly* will sell O_1M_1 of output for which the Average Cost is Q_1M_1 which is not the lowest The lowest Average Cost will be represent ed by the lowest point on the Average Cost Curve Thus in Imperfect Oligopoly the firm will be in equilibrium when its Marginal *Cost and Marginal Revenue are equal and it earns* normal profits by selling O_1M_1 output at price O_1P_1 which equals Average Cost Q_1M_1 In Perfect oligopoly when the Average Cost is the minimum, the size of the firm is said to be optimum In Imperfect Oligopoly the firm cannot reach an *optimum size since when it is in equilibrium, i e when its* Marginal Cost equals Marginal Revenue its Average Cost is above the minimum

Let us turn to Imperfect Competition characterised by product-differentiation and see how firms will behave For *example, suppose there are three firms producing three some*what different goods which are close substitutes Further, suppose they are making fairly good profits If there should be a change in transport costs, resulting in a decrease in the total cost of production, how would a firm react to such a situation? If a firm should reduce its price in response to the fall *in transport costs, it is likely* but not inevitable that other firms would reduce their prices Thus, a change in the price of one firm might lead to a mild price cutting or price war which may be detrimental to the different firms, i e profits of the various firms might decline However, in Imperfect Oligopoly *in so far as firms produce diverse commodities differ*ing slightly they enjoy a measure of independence so that unlike in Perfect Oligopoly the reactions may not be violent Nevertheless, the fear of retaliation on the part of other firms very often prevents any change in one's price Thus, the limitation on firms in Perfect Oligopoly is one firm cannot alter its price where as *in Imperfect Oligopoly* a firm can alter its

price but may not Thus, in practice even in Imperfect Oligopoly firms may be content to enjoy existing profits and therefore might not even under altered conditions reduce or raise their prices out of fear of consequences So long therefore as they earn reasonable profits they might prefer to continue as they are without upsetting their profits

PART FOUR

THEORY OF DISTRIBUTION

IV

THEORY OF DISTRIBUTION

1 PRICING OF FACTORS

We conclude imperfect competition and go on next to what is traditionally called the Theory of Distribution which however, *must truly be called the theory of factor prices or pricing* of factors Until now we have been discussing pricing of commodities in various situations such as monopoly, perfect competition, imperfect competition, monopolistic competition, oligopoly, perfect and imperfect. We turn now to pricing of factors which constitutes just an extension of the price theory which *can cover not only the subject of price in relation to ordinary commodities but also factors of production The reason* why modern economists have abandoned the title, "theory of distribution," is that they are theorists concerned with the forces governing the price of the various factors, land and labour, capital and entrepreneurship called rent and wages, interest and profits The 19th century economists on the other hand, called *this department of economics Distribution* as, *for political* and social reasons, they were interested in the distribution of the product of industry or the national income among the different factors, i e they were interested in the shares of the different factors in the wealth produced Therefore, while the earlier economists laid stress on the social and political aspects of the problem, today, we are emphasising the theoretical aspect *of how the price of a factor is fixed Since factors are* complementary, the returns to factors vary with the proportion of the factors employed, i e different combinations of the same factors may yield different outputs Such variations in output are governed by the laws of returns

Thus in studying factor prices we shall be involved in a study of the different laws of returns

In discussing the subject *of combinations of factors and their*

effect on the product, we can apply a method similar to the one used in the sphere of consumption In production, various factors are used in combinations even as in consumption various goods are consumed in combinations Thus, there is a likeness between the use of the factors and the use of commodities Again different combinations of commodities may have equal significance, i e may give equal amount of satisfaction In like manner, in production we may conceive of different combinations of different factors under given technical conditions producing equal outputs Just as in consumption to simplify our analysis, the number of goods consumed was limited to two goods, number of factors used is limited to two This simplification is for convenience of representing diagrammatically goods and factors consumed and employed by consumers and producers respectively In the sphere of production, therefore, we can show the different combinations of two factors labour and capital measured along the two dimensions, *OX* & *OY* of a two dimensional diagram All combinations of *X* & *Y* are by assumption yielding an Equal Product

II EQUAL PRODUCT CURVE

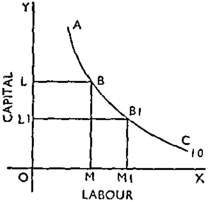


Figure 76

This is an Equal Product Curve showing factor labour along the X' axis and factor capital along the Y' axis One combination of labour and capital is represented by point *B* on the

Equal Product Curve B represents the combination OL of capital and OM of labour Again B_1 is another combination on AC and B_1 represents OL_1 of capital and OM_1 of labour Either combination can produce the same product i.e. 10 units Therefore any point on the Equal Product Curve represents a combination of labour and capital which can yield 10 units of a commodity Sometimes the equal product curve is called Iso Product Curve or Iso-Quant. There are various names given by different authors But the simplest title is Equal Product Curve One obvious resemblance between an equal product curve as shown here and an indifference curve is that different combinations along the two curves are of equal significance to producers and consumers i.e. different combinations of factors of an equal product curve produce an equal product and different combinations of goods on an indifference curve yield equal satisfaction. However, there is one difference between an equal product curve and an indifference curve In the case of the former the product which is the result of the combination of factors can be measured in physical units while the satisfaction from a combination of goods cannot thus be measured. Further, similar to indifference maps, one may construct maps for equal product curves showing a number of such curves which represent different amounts of product.

EQUAL PRODUCT MAP

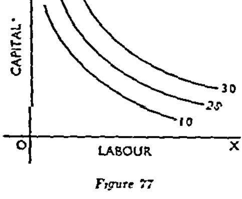


Figure 77

This is an Equal Product Map showing a number of equal product curves for different amounts of the product. Thus the lowest curve starts with 10 units of the product produced with different combinations of labour and capital The next one shows 20 units of the product The highest curve shows 30 units and so on. Thus the lower equal product curves show smaller amounts and the higher curves larger amounts Once again comparing an equal product map with an indif ference map in an equal product map the different amounts represented by different equal product curves are measured exactly in physical units Whereas in an indifference map the lower indifference curves represent combinations which yield less satisfaction than combinations on higher indifference curves Thus we can at best speak of one combination on a higher indifference curve being better than another combi nation on a lower indifference curve or we may say that one combination on a higher indifference curve gives greater satisfaction than another combination on a lower indifference curve But since satisfaction cannot be measured one cannot say how much more satisfaction one can get from a combina tion on a higher indifference curve than on a lower indifference curve so much so that in an equal product map each curve may be labelled according to the amount of the product as in our diagram such as 10 units curve 20 units curve and so on In an indifference map one has to be satisfied with numbering the curves 1 2, 3 and so on

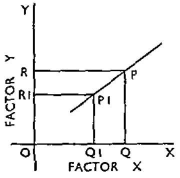


Figure 78

Increasing Returns in a combination as the variable factor is increased, returns will increase Under the Law of Diminishing Returns, returns will decrease Thus, the product cannot be constant Therefore, an Equal Product Curve cannot be horizontal It must, therefore, be a downward sloping curve and not an upward sloping curve, in which case as one factor decreases the other factor increases and all combinations of the two factors X & Y will keep the product constant OR of Y plus OQ of X will produce asmuch as OR_1 of Y

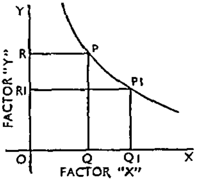


Figure 80

plus OQ_1 of X The movement from P to P_1 along the equal product curve involves the decrease in Y and an increase in X so that the product will be constant.

Secondly, like indifference curves equal product curves are convex to the origin, thus:

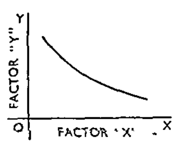


Figure 81

This characteristic implies that the marginal significance of one factor in terms of another factor diminishes along an equal product curve In consumption where a consumer consumes two goods in different combinations along a given indifference curve, the marginal significance of one good in terms of the other good diminishes along the curve The marginal significance of good X in terms of good Y is the amount of Y which can be given up for one more unit of X and along an indifference curve, the marginal significance of X in terms of Y diminishes

Suppose the consumer is at P Then he has OR of Y and OQ of X In order to get one more unit of X i e QQ_1, the consumer must give up RR_1 of Y To get one more unit of X, i e Q_1Q_2, the consumer must give up R_1R_2 of Y and similarly to get a third unit of X the consumer must give up R_2R_3

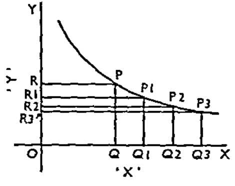


Figure 82

of Y Therefore, the marginal significance of QQ_1 of X in terms of Y is RR_1 The marginal significance of Q_1Q_2 of X in terms of Y is R_1R_2 of Y But R_1R_2 is less than RR_1 Therefore, the marginal significance of X in terms of Y has decreased. Further, the marginal significance of Q_2Q_3 of X in terms of Y is R_2R_3 and R_2R_3 is less than R_1R_2 and hence the marginal significance of X has further decreased. Then the marginal significance of X in terms of Y is seen to diminish as more and more of X is acquired by giving up less and less of Y The same is true of factors of production. The marginal signifi

cance of factor X in terms of Y is the amount of Y which can be given up in exchange for an additional unit of X and the marginal significance of X in terms of Y diminishes along an equal product curve Suppose this is an equal product curve, and X is one factor of production and Y is another factor of production Once again what we said before will apply At P producer combines OR of Y with OQ of X to produce 20 units To use one more unit of X and still be on the same curve, the producer must give up RR_1 of Y Therefore, the marginal significance of QQ_1 of X is RR_1 of Y and the marginal significance of Q_1Q_2 of X is R_1R_2 of Y and the marginal significance of X has fallen and the marginal significance of Q_2Q_3 of X is R_2R_3 in terms of Y and the marginal significance of X in terms of Y has further fallen Thus, to get one more unit of X lesser and lesser amounts of Y are given up so that the marginal significance of X in terms of Y along the equal product curve diminishes

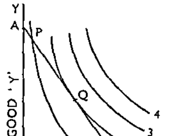


Figure 83

This is a diagram showing the equilibrium of a consumer with a given income buying goods X & Y at given prices With his income he can buy OA of Y or OB of X or com binations of X & Y Since his income can buy OA of Y and OB of X, OA of Y must equal OB of X If there were no money and X & Y were exchanged for each other the

price of X will be in terms of Y and that of Y in terms of X The consumer can reach Q, the point of tangency between indifference curve 2 and the price line AB, by moving along the price line, leaving behind lower indifference curves and reaching higher indifference curves At the equilibrium position Q the consumer will maximise his satisfaction since the marginal significance of X in terms of Y equals the price of X in terms of Y, i e the slope of the indifference curve 2 equals the slope of the price line AB at Q But at P on indifference curve 1 the marginal significance of X in terms of Y is greater than the price of X in terms of Y and as he acquires more and more of X by giving up Y the marginal significance of X in terms of Y diminishes, i e as he moves from P to Q, he gets more of X and less of Y At Q the marginal significance of X in terms of Y would have fallen and become equal to the price of X in terms of Y

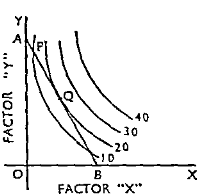


Figure 84

We shall apply the analysis to an equal product map and the equilibrium of the producer Again AB is the price line showing factor prices in the market, i e. the producer may buy either OA of Y or OB of X and the prices of X & Y measured in terms of each other, i e how much of X will exchange for how much of Y will depend upon the rate of exchange between X & Y At Q the producer is in equilibrium and the marginal significance of X in terms of Y is equal to the price of X in terms of Y and Q is the point of tangency between

the Equal Product Curve and the price line AB Therefore, the slope of the equal product curve equals the slope of the price line However at P on a lower equal product curve the marginal significance of X in terms of Y is higher than the price of X in terms of Y As the producer moves down from P to Q he is acquiring more and more of X by giving up Y and as he gives up Y to acquire more of X the marginal significance of X in terms of Y decreases and equals the price of X in terms of Y at Q At point P the slope of equal product curve is greater than the slope of the price line showing that the marginal significance of X in terms of Y is greater than the price of X in terms of Y, while at Q the slope of the curve and the slope of the price line being equal the marginal significance of X in terms of Y equals the price of X in terms of Y The essential point to note is that as the producer moves along an equal product curve the marginal significance of one factor in terms of the other diminishes Therefore the significance of a convex equal product curve is the diminishing marginal significance of one factor in terms of the other

Like the indifference curves equal product curves cannot cut each other

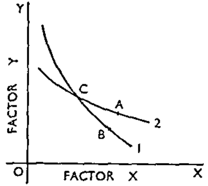


Figure 85

This figure represents two indifference curves cutting each other at C and where they cut each other the conclusion is

absurd Thus, A is a combination on indifference curve 2 and B is a combination on indifference curve 1 A, therefore, is better than B

Then A is as good as C and even so combination B is as good as C, C being common to both the indifference curves Therefore A must be as good as B is an absurd conclusion On the same lines, equal product curves cannot cut each other as the combination of factors X and Y, viz. A should be more productive than the combination of factors B but A will be as productive as C and similarly, B will be as productive as C and if the 2 equal product curves intersect this conclusion contradicts the previous conclusion, that A was more productive than B Hence neither indifference curves nor equal product curves can intersect. Therefore, the three characteristics of equal product curves (1) they slope downwards to the right, (2) they are convex to the origin and (3) they cannot cut each other are parallel to the three characteristics of indifference curves The method of equal product curves can be used in studying returns to scale

III. RETURNS TO SCALE

As in consumption, explained in terms of indifference curves, in production, explained in terms of equal product curves, the analysis is apt to be unrealistic because in consumption many goods are consumed in combination and not just two and in production generally more than two factors are involved. Thus, for example, labour and capital alone cannot be combined without the supervision of an organiser so that in reality more than two factors co-operate to produce goods but geometrically factors more than two in number cannot be represented on two dimensional diagrams Therefore, the limitation renders such an analysis less realistic and removed from actual practice But nonetheless the method indicates returns to variations in different factors combined to produce goods

Returns to scale may be considered in two stages, (1) returns to two factors both of which are varying, (2) returns to factors one of which is fixed and the other varying We shall first consider returns under factors both of which are varying

in terms of equal product curves Our analysis will be based on the assumption of perfect competition in the factor market so that the prices of the factors in relation to each other are given Secondly, the producer employs only two factors Under these conditions in the market with given prices of labour and capital the producer can combine labour and capital in different proportions increasing one and reducing the other and

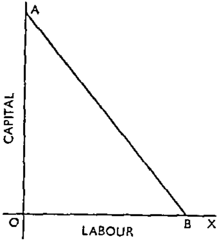


Figure 86

the price line AB represents the relative prices of labour and capital and market conditions On the other hand the equal product map of the producer showing different levels of out put represents technical conditions of production under which one might produce a given output with different combinations of labour and capital and the producer operating under given market conditions and technical conditions of production will seek to produce a given output as cheaply as he can The cheapest combination of labour and capital would lead him to the equilibrium position which is the point of tangency between the given price line and an equal product curve as shown in the diagram Q in the figure therefore is the best possible combination of labour and capital as he can produce 20 units of the commodity at the lowest cost At Q the mar

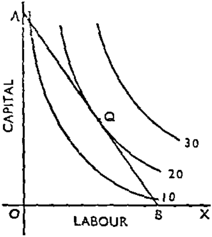


Figure 87

ginal significance of labour in terms of capital equals the price of labour in terms of capital. From the equal product map and corresponding price lines in reference to each of the curves, we can derive what is called the scale line

Scale Line

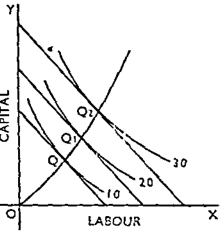


Figure 88

The diagram represents increasing supply of the product of the producer to meet a growing demand A larger and larger output is produced by employing more and more of factors, labour and capital Again the prices of the factors are assumed to be fixed by forces of competition so that each price line shows relative prices of labour and capital and each equal product curve shows the amount that can be produced under given technical conditions by varying combinations of labour and capital But to produce a given output at the lowest cost of production the producer will choose the equilibrium position, for example, to produce 10 units the equilibrium is Q which is the point of tangency between the equal product curve for 10 units and the price line Q_1 is the best combination to produce 20 units and Q_2 for 30 units and so on The curve passing through QQ_1 and Q_2 which may be called the $O\text{-}Q\,Q_1\,Q_2$ is the scale line which shows different amounts of the product produced at the lowest costs of production when the two given factors labour and capital are both variable and the relative prices of labour and capital are fixed in the market A producer, therefore would move along $O\,Q\,Q_1\,Q_2$ the scale line, when his supplies vary with demand With the help of the scale line we can find out whether, as factors are varying, returns to them increase at an increasing diminishing or constant rate

Constant Returns Homogeneous Production Function

We shall first consider constant returns If a given combination of two factors produces a given product and the factors are doubled and the product is doubled and when the factors are trebled and the product is trebled, the change in the amount of the factors in a certain proportion causes a change in the product in the same proportion, i e the change in the product is proportionate to the change in the factors employed Here we have an example of constant returns Constant returns can be shown diagrammatically as follows

This is a scale line which, for convenience, is made a straight line without bending In the diagram constant returns to scale are shown in which the scale line under given prices of factors, labour and capital and given technical conditions shows output at different levels and returns to the factors are constant along the scale line as shown by the equal distances

between equal product curves Thus, $OA=AB=BC=CD$ Here we represent returns to scale or, alternatively, returns to out

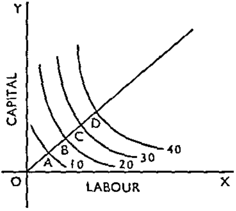


Figure 89

lay In other words the terms 'returns to scale' and 'returns to outlay' may be used interchangeably because when factor prices are given and factors are doubled in amount, the outlay on factors is doubled Hence one may speak of doubling of product due to the doubling of the factors, labour and capital, or the doubling of the product due to the doubling of the outlay This may be true when we assume that the proportions in which the two factors are changed remain constant. On the other hand, if the proportions of the two factors change as output is expanding, then it would be more accurate or correct to speak of returns to outlay rather than returns to scale, since when the product is doubled by doubling the outlay on labour and capital, the factor labour as well as the factor capital need not both be doubled in amount so that the ratio of the two factors might alter However, the increase in the product is proportionate to the increase in the outlay Hence, except when the proportions of the factors remain constant, changes in the product must be referred to as returns to outlay When returns are constant, as outlay and factors are both increased in constant proportions, such as it is in the above diagram, it is said that the productive function is homogeneous of the first degree, that is to say, *P is the function of the factors labour and capi*

tal, P being the amount of product and labour and capital the two given factors The product is the function of the factors, labour and capital means that the product depends upon the amounts of the factors, labour and capital used In other words the production function refers to the relationship between the product produced and the quantities of factors used When the production function is homogeneous, if the factors labour and capital are changed in any given proportion, the product will change in the same proportion Thus, if both labour and capi tal were doubled the product would be doubled or if they were trebled, the product would be trebled When returns are thus constant, both to scale and outlay such a production function is described as a homogeneous production function or a pro duction function homogeneous of the first degree This con cept of homogeneous production function is convenient and useful in theory In practice however since the proportions between factors may not be constant, while returns to outlay may be constant, production function may not be homogene-ous In theory, we assume, that the proportions between differ ent factors are constant, to facilitate analysis When we assumed a production function of the kind given in the dia gram, i e a homogeneous production function, returns to scale and outlay would be constant Actually however proportions vary between factors as production is varied For example, when a second storey is added to a factory building the pro portions of land and capital are altered But the factory with an additional storey might be producing double the output Hence summing up although in theory for convenience, cons tant proportions between factors are assumed, we have to drop this assumption in actual practice

Another question is whether as the factors are increased, returns to scale must be constant or whether returns could increase or decrease as output is expanded Again, in practice, over certain ranges of output, at lower levels, expansion may take place with increasing returns to outlay and over other ranges at higher levels of output, expansion would involve decreasing returns to outlay Increasing and decreasing returns to outlay are the result of economies and diseconomies of scale, economies arising from specialisation such economies assuming various forms such as technical economies, mana-

gerial economies commercial economies, financial economies, risk bearing economies, all of which constitute internal economies of a firm and yield increasing returns But expansion beyond a point would cause diseconomies which would reduce returns to outlay[1] Increasing and decreasing returns may again be shown on an equal product map

Increasing and Diminishing Returns

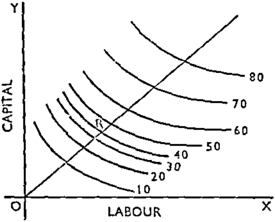


Figure 90

The scale line represents increased production with combinations of factors which are the cheapest Along the scale line upto *R*, as output is increased, returns to outlay increase Beyond *R* along the scale line, as output is increased returns to outlay diminish Each curve represents an addition of 10 units to the total product When output is increased from 10 units to 20 units, outlay on factors increases When output is increased from 20 units to 30 units, the increase in outlay is less than when output is increased from 10 to 20 units Similarly, the outlay on labour and capital will increase when output is increased from 30 to 40 units but the increase in outlay on 10 more units will be less than before This is brought out by the decrease in the distance between equal product curves Beyond *R* for every additional 10 units of the product, in

[1] *Structure of Competitive Industry* by E A G Robinson 1953

crease in outlay on labour and capital is incurred, i e the distance between equal product curves beyond R increases Thus, upto R increase in returns to outlay is enjoyed but beyond R on the scale line returns to outlay diminish

We might consider returns to scale in two stages, (1) the first stage in which all the factors are assumed to vary and (2) the second stage in which some are fixed and others vary For theoretical purposes the first stage in our discussion may be useful though in practice we find that some factors are fixed while some vary The second stage of our discussion has greater significance Again, for simplicity we shall assume that there are two factors employed, one of which is fixed while the other is varying The number is thus limited to two, for convenience of illustration diagrammatically

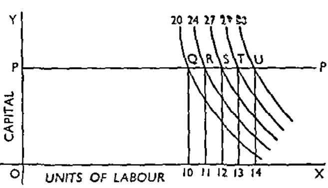


Figure 91

Here in the diagram we have two factors labour and capital Capital, as we see, is fixed at OP while labour is varying The horizontal line PP represents different combinations of capital and labour Thus at Q for example, the combination is OP amount of capital and 10 men (units of labour) At R the combination is OP capital and 11 men and so on Thus, capital is fixed while labour varies and the equal product curves represent different amounts of the product, viz 20, 24, 27, 29 and 30 units When *OP amount of capital is combined with* 10 men, the product is 20 units represented by Q When OP is the capital combined with 11 men, the product will be 24

units represented by *R* Therefore the addition to the total product made by the 11th man i e the marginal product of 11 men is 4 units of the commodity Further when *OP* capital *is combined with 12 men the product is 27 units Therefore* the marginal product of 12 men or the addition made to the total product by the 12th man is 3 units (27 24) When *OP* is combined with 13 men the product is 29 units so that the *marginal product is 2 units and finally for OP* and 14 men the product is 30 units and the marginal product is 1 unit Thus with a fixed amount of capital with variable amounts of labour are combined the marginal product of labour diminishes *We can represent the marginal product of different* amounts of labour by the marginal physical productivity curve (*MPPC*)

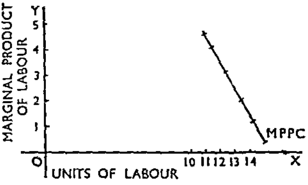


Figure 92

In the previous diagram the Marginal Product of 11 men was 4 units of the commodity that of 12 men—3 units of 13 men—2 units and of 14 men—1 unit We shall now plot these data on this diagram showing the marginal physical productivity curve It slopes downwards to the right showing *that as the variable factor (labour here) in a combination of* factors is increased the Marginal Product of the variable factor decreases This tendency is generalised under the title of the Law of Diminishing Returns or the Law of Variable Proportions which may be stated as follows An increase in the amount of a variable factor added to a fixed factor causes

in general, a less than proportionate increase in the amount of the product, with given technical conditions" This statement implies diminishing marginal productivity of the variable factor because the total product would increase at a diminishing rate only when the marginal product of the variable factor diminishes This case illustrates the tendency to diminishing returns in production When returns diminish, diminishing returns are reflected in a downward sloping marginal productivity curve However, over certain ranges of output additional units of the variable factor might add to the total product increasing amounts of the product, i e the marginal product of the variable factor might increase, when the marginal product of the variable factor thus increases, the marginal productivity curve will rise and as the marginal product of the variable factor subsequently falls, the marginal productivity curve will fall so that at first when the marginal product increases, and the total product increases at an increasing rate, increasing returns are reaped and later as the marginal product falls and the total product increases at a diminishing rate diminishing returns result

We shall now represent how returns will behave in a situation where there is a homogeneous production function under varying proportions of factors, i e with one factor fixed and the others varying Hitherto in our diagram showing an equal product map with equal product curves for different amounts, viz 10 units, 14 units, 17 units, 19 units and 20 units, the physical productivity at the margin of the variable factor, labour, decreased The same fact could be shown in a different way in the following diagram

Again we have an equal product map showing equal product curves for 1 unit, 2, 3 and 4 units of the product and the fixed factor is capital and the variable factor is labour The horizontal line *PP* which is parallel to *OX* represents different combinations of labour and capital with varying proportions of labour combined with a fixed amount of capital To produce 1 unit of the product *OP* of capital is combined with *OA* of labour To produce 2 units, *OP* of capital is combined with *OB* of labour Therefore the additional 1 unit is due to the additional labour *AB* Therefore, the marginal product of labour is added by a greater amount of labour than before

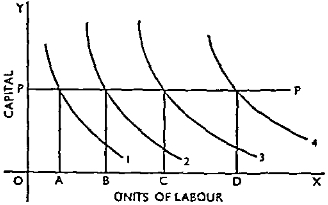


Figure 93

This is shown by the fact that AB is greater than OA. Again to increase the product from 2 units to 3 units, BC amount of labour is employed and BC is greater than AB and finally to increase the output from 3 to 4 units, CD amount of labour is employed and CD is greater than BC. Thus, to increase the output by the same absolute amounts, viz. 1 unit, each time more and more labour must be combined with given capital. This means that we start with OA units of labour and OP capital. To produce 1 more unit, AB units of labour with OP

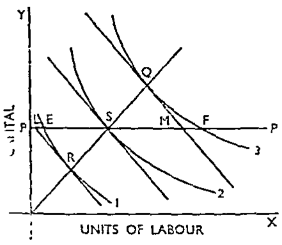


Figure 94

capital were required so that the product per unit of labour must have diminished and similarly to produce 1 more unit again, a larger number of units of labour were required As we move along *PP*, the marginal productivity of labour decreases This shows how when the production function is homogeneous when one factor is variable its marginal productivity diminishes To prove that whenever proportions between factors vary, the marginal productivity of the variable factors decreases while whenever all the factors are variable, returns are constant the following diagram may be drawn

OR RS & *SQ* are equal The lines tangent to the equal product curves are parallel to each other The line passing through the origin is the scale line showing how both the factors are variable Here we have an equal product map with equal product curves for 1 unit, 2 units and 3 units The scale line passing through *O* shows two variable factors labour and capital and the returns are constant

RS & *SQ* the intersects between the equal product curves for 1 unit and 2 units and 2 units and 3 units, are equal. The line *PP* is a horizontal straight line parallel to *OX* showing a fixed amount of capital *OP* used with varying amounts of labour We have to prove that when a variable factor is used in conjunction with a fixed factor, the marginal productivity of the variable factor diminishes, i e to say as we move along *PP* to produce the same absolute amount of product increasing amounts of labour have to be employed In other words, if we prove that the intersect *SF* between the 2 unit equal product curve and the 3 unit equal product curve is greater than the intersect *ES*, between the 1 unit equal product curve and the 2 unit equal product curve, the returns to the variable factor are seen to be diminishing The slope of the equal product curves on the same scale line will be the same so that the tangents of the equal product curves must be parallel If *SQ* = *RS* and the tangents are parallel, *LS* must equal *SM* but *ES* is smaller than *LS* (being a part of *LS*) Therefore, *ES* is smaller than *SF* or conversely *SF* is greater than *ES*

This signifies that to produce 1 unit of the product we need *OA* of labour To produce 2 units, we need *OB* of labour, to produce 3 units we need a larger amount of labour The conclusion therefore is that when a variable factor is used with a

fixed factor, the marginal productivity of the variable factor *must fall*

Until now we have considered diminishing returns shown by the Diminishing Marginal Product of a variable factor when we have used it with a fixed factor

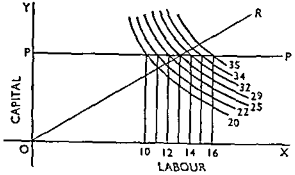


Figure 95

Here is shown an equal product map, each curve representing different combinations, technically, of different factors labour and capital which *produce a given output. OR is the* scale line showing expansion of output with the two variable factors labour and capital *PP* is a horizontal straight line *showing one fixed factor and one variable factor in combination* Thus with *OP* capital different amounts of labour are combined and as a result, output varies and upto a point the increase in output is more than proportionate to the increase in the variable factors shown by increasing marginal productivity of labour Thus output increases from 20 to 22, 22 to 25, 25 to 29 units as labour is increased from 10 men to 11 men, 11 to 12 and from 12 to 13 men, the marginal product of 11 men being 2 units, of 12 men 3 units and 13 men 4 units Thus the marginal product increases till 13 men are employed *Beyond this point the increase in the total product is at a* diminishing rate, i e it increases from 29 to 32 units, 32 to 34 units and from 34 to 35 units Thus the marginal product of 14 men is 3 units, of 15 men 2 units, of 16 men 1 unit. Therefore, the marginal productivity of the variable factor labour at first increases and subsequently decreases This is

so, whether we move along *OR* or along *PP*. The first phase of expansion is marked by increasing returns and the next phase by decreasing returns We can show the trend of the marginal product in the form of a marginal physical productivity curve

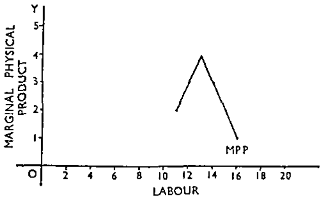


Figure 96

This is the curve which we get by plotting the points It has a rising slope followed by a declining slope This is just a variation of the previous diagram The trend of the marginal product of labour is seen in the marginal physical productivity curve Upto 13 men it goes up and then comes down Thus the rising slope of the curve shows how when more and more of labour adds to the total output, the marginal product increases or rises In other words, production is governed by the Law of Increasing Returns But if employment of labour is continued, Diminishing Returns eventually set in

Increasing returns are represented by increasing marginal productivity of factors in another kind of diagram which shows combinations of two variable factors and combinations of one fixed and one variable factor

There are three equal product curves for 1 0, 1 5 and 2 0 units of the product In one case both labour and capital are varying This is shown by the movement along the scale line *OR* In the second case only one factor is varying while the other is kept constant and this is shown by the movement along *PP*, the horizontal straight line Along *OR*, the scale line, at *N*,

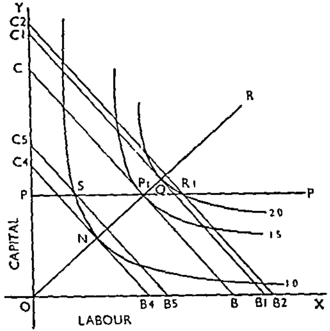


Figure 97

output is 10 units, N being on the equal product curve for 10 units At P_1 the output is 15 and at Q the output is 20 units Therefore, as we move from N to P_1 and P_1 to Q, the total output increases by 5 units each time and as one moves from N to P_1 both labour and capital are employed in greater amount and therefore the outlay on labour and capital will be *increased* Similarly, when one moves from P_1 to Q more of labour and capital will be used and total outlay further increases But the increase in outlay this time will be less than before This is shown by the fact the distance P_1Q or the intersect between the 15 and 20 unit equal product curves is shorter than the intersect P_1N between the 10 and 15 unit equal product curves Similarly, if capital is constant at OP while labour is varying, when output expands, at S output is 10 units, at P_1 it is 15 units and at R_1 it is 20 units To move from S to P_1 additional outlay on labour will be incurred and to move from P_1 to R_1, again an additional outlay on labour will be incurred

But the additional outlay to expand output from 1 5 to 2 0 units will be less than the additional outlay for expanding output from 1 0 to 1 5 units Therefore, P_1R_1 is less than SP_1 Hence in the first case of two variable factors involving a movement along OR if P_1Q is less than NP_1 outlay diminishes or the marginal productivity of the factor increases In tho second case with one variable factor labour and one fixed factor capital, again outlay diminishes as output is increased, i e PR_1 being less than SP_1 The decrease in outlay implies in creasing marginal productivity of labour This is therefore, an example of increasing returns to factors reflected in increased marginal productivity

The cost of 1 0 units in terms of labour will be OB_4 or OC_4 in terms of capital The cost of 1 5 units in terms of labour will be OB or OC in terms of capital The cost of 2 0 units in terms of labour will be OB_1 or OC_1 in terms of capital Thus when output increases from 1 0 units to 1 5 the cost will in crease by B_4 to B or C_4 to C This would measure the cost of extra output from 1 0 to 1 5 units The cost of 2 0 units will be OB_1 and OC_1 in terms of labour and capital Therefore, for 1 5 to 2 0 units increase in cost$=BB_1$ or CC_1

Similarly with regard to one variable which involves movement along PP we may measure cost in terms of labour and capital The cost of producing 1 0 units along PP will be OB_5 in terms of labour S on the price line representing either OB_4 of labour or OC_4 of capital When we are at S, we are incur ring in terms of labour OB_5 of labour and in terms of capital OC_5 of capital The cost of expanding output from 1 0 to 1 5 units will be B_5B in terms of labour or C_5C in terms of capital

Now similarly in order to expand output from 1 5 to 2 0 units in terms of labour it will be BB_2 or CC_2. Once again we notice BB_2 is less than B_4B and in terms of capital CC_2 is less than C_4C which means that the marginal outlay would be less than before

The increase in returns along OR is greater than what it is along PP In other words, the law of Increasing Returns is more powerful along the scale line OR than along the hori zontal line PP

To show that the increase in returns is faster on OR than on PP we may consider cost in terms of labour What is the

additional cost due to the first extra .5 units produced, i e when we are varying both the factors, capital and labour? It is B_4B It represents the additional cost of expanding output from 1 0 to 1 5 units and BB_1 represents additional outlay due to expansion of output from 1 5 to 2 0 units If we subtract BB_1 from B_4B, we get the difference in outlay

Again if we deduct BB_2 from B_3B we shall know the difference in outlay for expanding from 1 0 to 1 5 and additional 1.5 to 2 0 units and the difference between B_4B and BB_1 is greater than the difference between B_3B and BB_2. In other words the excess of B_4B over BB_1 is greater than the excess of B_4B over BB_2. Hence when moving from P_1 to Q along OR the fall in outlay is steeper than in moving from P_1 to R_1 along PP Now why should there be this difference between a movement along OR and PP or why should the law of Increasing Returns be stronger along OR than along PP? One reason is as we move along OR, the proportions between labour and capital are varied so that the firm can produce by combining the two factors in such a way that costs are kept at a minimum for a given output. But along PP the proportions between the two factors cannot be varied as one factor is fixed and the optimum combination may not be possible Consequently, even though outlay may increase at a diminishing rate so that increasing marginal productivity results still returns along PP will increase less rapidly or the fall in costs or outlay will be less than along OR What has been said of two factors of production in the light of the laws of returns, may be extended to cover more factors, i e to say our analysis of returns to scale may be applied when, in production, more than two factors may be used, i e when several factors are employed, some being fixed and others variable, the marginal productivity of factors is seen to rise or fall according to the law of returns operating and internal economies or diseconomies of the firm

IV COST OF PRODUCTION (SHORT AND LONG RUN)

In concluding returns to scale or Laws of Returns, we have to discuss cost of production in the short run and the long

run Our discussion will be in terms of the Average Cost Cur ves in the short period and in the long period The short period is definable as the duration during which some factors are fixed while some are varying so that the firm can expand output upto the maximum capacity of its plant or fixed factors To understand the Average Cost of a firm in the short period and the long period one should distinguish between fixed costs and variable costs Fixed costs are items of expen diture like rent, cost of maintenance, insurance charges, inte rest on debentures, and cost of administration which are independent of output and hence cannot be avoided even when the firm may be producing no output Thus the fixed costs will be constant for a larger or a smaller output Consequently, as the output expands the fixed costs will be spread over a larger and larger output and the Average Cost (The Average fixed cost) per unit decreases Conversely, when output decreases and the fixed costs are borne by a smaller and smaller output, the Average fixed cost rises Thus the average fixed cost varies inversely as the output This may be shown in the form of a curve called the Average Fixed Cost Curve sloping downwards to the right.[1]

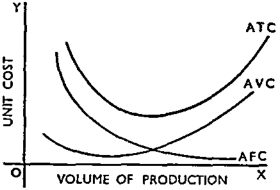


Figure 98

Variable costs which form another item of costs of produc-

[1] Ibid ch , 5, p 109

tion are those costs which vary directly as output such as labour costs material costs, cost of power and fuel and transport costs These increase with output and decrease with output so that if the increase in variable costs should be exactly proportionate to the increase in output, average variable cost will be constant. This presupposes given prices of factors so that the cost of factors will remain constant. But in practice prices of factors change and factor costs will not be constant and at lower levels of output as output is expanded the Average Variable Cost might slightly decrease until the maximum capacity of the plant is reached Beyond this however due to increase in strain on the plant and the organisation of the firm its management and supervision, Average variable costs sharply rise and assume the shape shown above

If we add these two costs, average fixed and average variable cost, we get the average total cost curve, just called the average cost curve The average cost or the average total cost curve has the shape of a *U* sloping downwards at first and later upwards How should we explain this shape of the Average cost curve whether in the short run or long run? Average cost curves have the shape of a *U* because of the trend of the Average fixed cost and the Average variable cost. The average fixed cost decreases progressively with every increase in output *since fixed costs are spread over greater output.* The average variable cost, however, rises sharply beyond a point on expansion of output. This sharp rise in the variable costs outweighs the fall in the fixed costs so that upto a point the average total cost will fall and subsequently rise Thus the average total cost curve or simply the average cost curve has the shape of a '*U*' We may account for the fall in the Average variable cost in the initial stages by the operation of the law of Increasing Returns due to internal economies of the firm. The rise in the average variable cost in the later stages may be attributed to the Law of Diminishing Returns due to diseconomies. *In the short run therefore, returns to variable* factors diminish because some factors like capital and management cannot be altered and every increase in men and materials would bring down the marginal product of the variable factors In other words the increase in output does not keep pace with the increase in variable factors, and the Aver

age variable cost rising steeply, the average total cost is pushed up

In the long run, however, even fixed factors of the short period could be varied and therefore generally all factors of production are variable factors in the long run Hence the fixed costs of production, given time, could be altered by the firm Thus in the long period, rents, insurance charges, administrative costs would all be changed and thus they would no longer be fixed as in the short run The longer the period the fewer will be the fixed costs and the greater the variable costs When variable factors are increased the rise in the average total cost will be less than in the short run, since between the fixed factors and the variable factors there could be a better adjustment in the long run

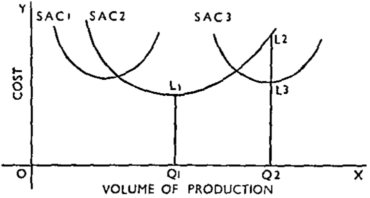


Figure 99

This figure represents the Average cost in the short run and in the long run The average cost of OQ_1 output is L_1Q_1 on the Average cost curve SAC_2 In the short run when the fixed factors cannot be altered amount OQ_2 can be produced at L_2Q_2 average cost But in the long run when the firm could be reorganised through a change in the fixed factors the average cost of OQ_2 will be L_3Q_2. L_3 being on the average cost curve SAC_3 which is the new short run average cost curve after the reorganisation of the firm In the long run, therefore, when the firm could be altered the average cost would be lower than

before when the same output would have cost more This is shown by the fact that L_2Q_2 is less than LQ_1 SAC_1, SAC_2 and SAC_3 are the short run average cost curves for different scales of operations and each curve represents a given plant which can produce a given output at the minimum average cost. Thus when the firm is on the average cost curve SAC_1, it can produce OQ_1 and this output OQ_1 produced at the lowest average cost is the optimum output of the firm

In the foregoing analysis we discussed the average cost of production in the short run and in the long run One conclusion we arrived at was that in the long run due to the re-organisation of the firm, the average cost could be reduced If, however, there were no change in the fixed factors the average cost would be higher Thus the average cost varies from the short period to the long period One situation which we may consider in the long run is the operation of the Law of Constant Returns Different outputs may be produced by a firm at constant costs by varying the plant and therefore in the long run the increase in output or the decrease in the output would be exactly proportionate to the variable factors and so costs of production This is represented in the diagram shown below

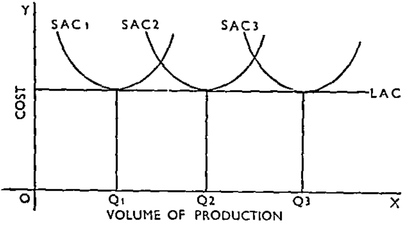


Figure 100

We have constructed here three different short run average cost curves called SAC_1, SAC_2 and SAC_3 and outputs OQ_1, OQ_2

and OQ_1 are produced by changing the scale of operations or output SAC_1 which is the short run average cost curve represents a given scale of operations or a scale of output in which OQ_1 output is produced at the minimum average cost Again to produce OQ_2 output at the lowest possible cost the firm is reorganised, i e the plant is changed so that the new scale of operations is represented by a second average short run curve SAC_2 with which OQ_2 can be produced at the minimum aver age cost If the output were OQ_3 again the plant must be changed so that the new plant is represented by the new short run average cost curve SAC_3 This would mean that with the same plant if different outputs are produced such as OQ_1 OQ_2 and OQ_3 the average cost will vary Joining the tangents of the SAC curves we derive the long run Average cost curve LAC In this the long run average cost curve is a horizon tal straight line signifying constant cost or constant returns Such horizontal long run Average cost curves may be a theoretical possibility because it is based on certain unrealistic assumptions namely the factor prices will be constant and the factors are infinitely divisible In practice the factor prices vary and factors are indivisible—that is to say it is not possible to vary the size of machines infinitely Consequently a horizontal long run average cost curve is possible only in

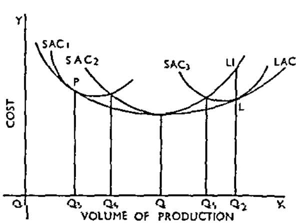


Figure 101

theory In practice, however, the long run average cost curve will not be horizontal but will have the shape of a '*U*' just as short run average cost curves have a *U* shape

The tangents of the short run cost curves *SAC* are at different levels and by joining the tangents we get the long run average cost curve having the shape of *U*

Each short run average cost curve refers to a certain scale of operations Here are shown different outputs OQ_1, OQ and OQ_2 which are *produced at different average costs* Of these outputs output OQ is produced at a lower average cost than OQ_1 and OQ_2 Therefore, OQ_1, OQ and OQ_2 are different outputs on the long run average cost curve—*LAC* This curve *LAC* is called an envelope since it covers the short run average cost curves SAC_1, SAC_2 and SAC_3 The diagram shows further that to produce at the lowest possible average cost varying amounts, the scale of operations has to be changed To produce OQ_1 the *scale of operations is represented by* SAC_1, *to produce* OQ, by SAC_2 and to produce OQ_2 by SAC_3 If, however, output OQ_1 were produced on SAC_2, the average cost would be higher than in the long run when it is produced at SAC_1, since in the long run the plant is changed Thus in the long run owing to the change in the firm, costs of production would be less while in the short run they would be more Thus it is cheaper to produce in the long run than in the short run as fixed factors in the short run become variable factors in the long run.

Another feature of the long run average cost curve is it is '*U*' shaped like the short run average cost curves SAC_1 SAC_2 and SAC_3 But the long run average cost curve is flatter than SAC_1, SAC_2 and SAC_3 Further we can observe in the long run the average cost need not be the minimum but it may be higher than the minimum. In the case of SAC_1 when output OQ_4 is produced the average cost is the minimum but the firm intends to produce OQ_1 Hence the average cost PQ_1 is more than the minimum average cost. Again in the case of SAC_3 the firm produces at a minimum cost but it can produce OQ_2 at a cost higher than the minimum that is to say LQ_2 is more than the minimum average cost on SAC_3 This can be explained by the fact of indivisibility of factors of production Although in the long run the firm cannot reduce its average cost to the minimum it can produce in the long run at a lower

cost than in the short run. The long run average cost curve need not be tangential to the short run average cost curves at their lowest points excepting when the short run average cost curve is tangential to the long run average cost curve at the lowest point of the long run average cost curve In the diagram, for example the tangents of P and L are not the lowest points of the curves SAC_1 and SAC_3 but the long run average cost curve LAC is tangential to SAC_2 at the lowest point of SAC_2 This means that the different outputs produced in the long run are not necessarily optimum outputs Thus on the long run average cost curve LAC OQ_3 is not the optimum output, that is output with the lowest average cost Similarly, OQ_1 is not the optimum output, but OQ is the optimum output

The relationship between the marginal and average cost curves can be shown in the following diagram

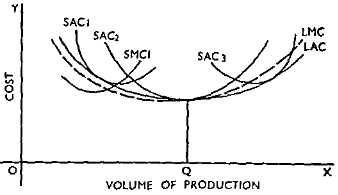


Figure 102

This shows in the long run the marginal cost changes less sharply than in the short run as indicated by a flat long run marginal cost curve

The conclusion of our study of costs in the long run and the short run is that in the short run costs vary more than in the long run since some factors are fixed while in the long run generally all the factors are variable

V MARGINAL PRODUCTIVITY

We have to discuss the forces which govern the pricing of various factors from the side of demand, that is, the employer or producer using different factors of production One fundamental determinant of the pricing of a factor is the productivity of that factor Hence the key to the problem of factor prices is found in the concept of productivity

Unlike ordinary goods and commodities, factors and agents of production have derived demand and this is due to their productivity It is this fact of productivity of factors which creates the demand Hence we have to look at the pricing of a factor of production, in general, on its demand side, from the point of view of the productivity of the factor Further the productivity of a factor of production which influences the determination of its price, is the productivity at the margin or marginal productivity The concept of marginal productivity has been developed in reference to the factor of production, labour, and what is true of labour is equally true of other factors With reference to labour the price of labour is based on the productivity of labour Thus, wages depend on the marginal productivity of labour on its demand side We are familiar with the relationship between marginal cost and marginal revenue in the case of ordinary goods and how the producer of ordinary goods maximises his total net profits by equating marginal cost and marginal revenue On the same lines, the employer of a factor, say, labour, would maximise production and thereby can maximise income by equating the marginal productivity of a factor (labour here) and its marginal cost. To develop this analysis we shall work on certain assumptions in regard to labour, such as 1 Perfect Competition in labour market on the side of employers and workers resulting in a given wage rate existing at a time 2 Perfect Competition in the product market implying a given price for the product. 3 All units of the factor, labour, are assumed to be homogeneous, so that all workers are equally efficient. 4 Labour is measured in man hours which are fixed per unit of labour 5 Finally, that labour alone is variable and all the other factors are fixed or constant, so that we could calculate the marginal productivity of labour in physical terms To illustrate the

trend of marginal physical productivity, we shall postulate a firm or producer producing wheat by increasing the labour force The trend of the total productivity and marginal productivity is shown in the following table

Total & Marginal Physical Productivity of Labour

Units of Labour	Total Product (in lbs) of Labour	Marginal Phy Product of Labour (lbs.)
10	60 Lbs	60 Lbs
20	130	70
30	250	120
40	450	200
50	700	250
60	1000	300
70	1270	270
80	1520	250
90	1700	180
100	1800	100

Labour is increased from 10 to 100 units and accordingly the total product is increasing from 60 lbs to 1800 lbs as shown above Thus in the marginal physical productivity column, at first the marginal product of labour increases from 60 to 70 70 to 120 and so on but when the 70th unit is added, it declines The trend of the marginal physical product of labour is important showing how as the factor labour is increased at first, the total product increases at an increasing rate and subsequently, at a diminishing rate that is to say, the change in the rate of increase in the total product is caused by the fall in marginal productivity So long as marginal productivity was increasing the total product increased at an increasing rate and the moment the marginal product declined the total product increased at a decreasing rate We are interested in the marginal physical productivity of the variable

factor labour The trend of the marginal physical product may be shown graphically as below

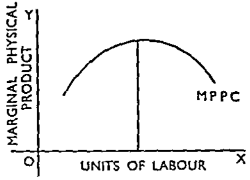


Figure 103

OY measures the marginal physical product of labour and *OX*, units of labour and the marginal physical productivity curve of labour is an inverted *U* It, therefore, represents a normal marginal physical productivity curve Thus, we might say along *OX* in the figure till 60 men are employed, marginal physical product increases Beyond the 60, marginal physical product falls Therefore, this is called the marginal physical productivity curve It is important to note that the decline in the marginal physical product when more than 60 men were employed was not due to any difference in efficiency of subsequent workers but due to technical conditions of production which do not permit an indefinite increase in the variable factors employed in conjunction with fixed factors The concept of marginal physical productivity leads us to the concept of marginal revenue productivity, *i e* productivity of additional workers or marginal workers in terms of the additional revenue due to them and marginal revenue productivity can be estimated by multiplying the marginal product by the price of the commodity Thus on the assumption of a given price of the commodity say Rs 5 marginal revenue productivity can be derived from the marginal physical productivity and price Thus corresponding to the marginal physical productivity, we

have marginal revenue productivity of the factor This is shown in the following marginal revenue productivity table

Marginal Revenue Productivity of Labour

Units of Labour	Mar Physical Productivity of Labour	Marginal Revenue Product of Labour
10	60	Rs 300
20	70	350
30	120	600
40	200	1000
50	250	1250
60	300	1500
70	270	1350
80	250	1250
90	180	900
100	100	500

Again on the basis of this schedule we may show the trend of the marginal revenue productivity of labour by drawing a graph or marginal revenue productivity curve

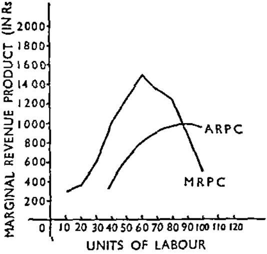


Figure 104

Along *OY* we measure the marginal revenue product in rupees and along *OX*, the units of labour employed Plotting the points on the basis of the schedule, we get the marginal revenue productivity curve

What is important about this curve is, like the marginal physical productivity curve, it is like an inverted 'U' rising at first and falling subsequently The rising slope of the curve shows the increase in marginal revenue product and the falling slope shows the decrease in the marginal revenue product

We could work out the average revenue product of labour by dividing the total revenue by the number of men at each stage in the expansion of labour force and with the data obtained for average revenue product, if we construct an average revenue productivity curve, the average revenue productivity curve in relation to the marginal revenue productivity curve would be as shown above The marginal revenue productivity curve will cross the average revenue productivity curve at the highest point of the average revenue productivity curve.

We have constructed the marginal revenue productivity curve and the average revenue productivity curve and noted the relationship between the two curves, when the marginal revenue exceeds the average revenue, the marginal revenue curve must lie above the average revenue curve and once the marginal revenue falls below the average revenue, the marginal revenue curve will lie below the average revenue curve, and the marginal revenue productivity curve cuts the average revenue curve at the highest point. Proceeding from this point we have to consider the average net revenue productivity of a factor because no one factor can alone produce a good Different factors in combination help to produce it. Consequently, the product due to one factor has to be separated from that due to other factors in order to determine the average revenue productivity of that factor and on the basis of the average revenue product of that factor, the price of the factor In the case of labour, for example, the average revenue productivity curve—*ARP* shows the revenue product due to one worker at each level of employment and this average revenue product was derived by dividing the total product by the number of men But in this would be included not only the

contribution of labour but also the contribution of other co-operating factors, such as capital and entrepreneurship. Hence, the average revenue product of labour is average gross revenue product. To determine accurately the revenue product due to labour alone, we should deduct the value due to other factors, capital, entrepreneurship and so on because the wage, the price of labour, must equal the productivity of labour. There are two ways of determining the average net revenue productivity. The more elementary way is to assume that the revenue product of other factors, capital and entrepreneurship is negligible and therefore the increase in the revenue product is due to labour alone. Then the average gross revenue product and the average net revenue product might be regarded as identical. A more realistic way would be to find out the shares of capital and entrepreneurship from their prices and by deducting from the gross revenue product the product of capital and entrepreneurship, the net revenue product of labour is got. Therefore, we are interested not in the gross revenue product of a factor but its net revenue product and we must use the average net revenue productivity curve in connection with the pricing of labour or any other factor of production.

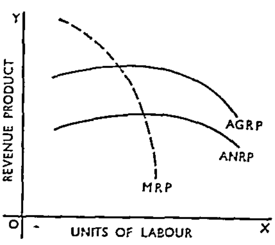


Figure 105

Here we have the average gross revenue product curve which we had in the last diagram which was called the average revenue product curve. We have the average net revenue product curve and the curve *MRP* the marginal revenue productivity curve which passes through the highest point of average net revenue productivity curve, *ANRP*. The significance of the curve *MRP* is that the marginal revenue productivity curve is the demand curve because the employment of a factor depends on the productivity of the factor at the margin. Therefore, we shall use these two curves *AGRP* & *ANRP* for our analysis. Further, since the demand for labour is a derived demand, the curve *MRP* is the derived demand curve for labour. With the help of these curves, we should now be able to analyse a situation under conditions of perfect competition in the factor market and product market.

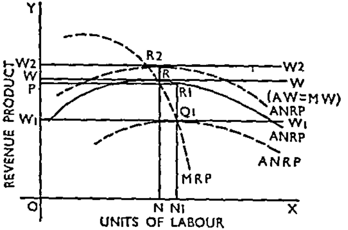


Figure 106

Here we have the horizontal line *WW* showing a given wage in the labour market wherein perfect competition is supposed to exist. (The wage line *WW* also represents the average wage and marginal wage because under competition wage is fixed.) Hence the wage will be fixed for a firm using labour and whatever the volume of employment, the wage is constant at *OW*. At this wage, *OW*, the producer or the employer could take on

workers till their marginal revenue product equals the wage This will happen when *ON* men are employed because when the wage is *OW* the marginal revenue product of labour is *NR* which is equal to *OW* Thus, marginal revenue product being equal to the wage, the profits of the firm will be maximum On the other hand, if less than *ON* men were employed, marginal revenue product would be greater than the wage (By the way, the wage is here also the marginal wage because in perfect competition it is given or fixed and marginal wage is marginal cost of labour) Thus, *ON* men will be employed to maximise the profits of the firm The firm, therefore, will be in equilibrium by employing *ON* men Any other volume of employment, more or less than *ON* men, would reduce the net profits of the firm We may generalise, therefore, that a producer or employer will use factors at a given price upto the point where the marginal revenue productivity of factors equals the marginal cost of factors Another inference is that under perfect competition the marginal revenue productivity will not only equal the marginal cost but also the average cost since the marginal cost and the average cost are equal Here when the firm is in equilibrium, the marginal revenue productivity of labour equals the marginal wage and therefore the average wage, as the average wage and the marginal wage are identical (This is like price being equal to marginal cost and average cost under perfect competition as under perfect competition the price of a commodity equals the average cost and marginal cost) Another important feature of this diagram is that not only the firm is in equilibrium but the industry is in equilibrium which makes that firm earn normal profits as shown by the average net revenue productivity curve—*ANRP*—which is tangential to the wage curve *WW* at *R* Thus, the average net revenue product, *NR* equals the average wage or the average cost of labour so that profits cannot be above normal Again there is a parallel between perfect competition governing the product market and the factor market In the product market in Perfect Competition a firm earns normal profits when its average revenue equals its average cost. Thus, here the average net product = the average cost due to labour And the industry is in full equilibrium Suppose the wage is reduced from *OW* to OW_1 and the new wage line is W_1W_1 Then the firm

can take on more workers upto ON_1. As more workers are taken on, their marginal revenue productivity will fall and it will equal the wage at Q_1. Thus, once again the firm is in equilibrium earning maximum profits as the marginal cost of labour OW_1 equals the marginal revenue product. But the firm earns abnormal profits shown by the rectangle $W_1Q_1R_1P$ and abnormal profits arise because of the average net revenue product being above the average wage or the average cost of labour, the average net revenue product being R_1N_1 and the average cost Q_1N_1. If we subtract Q_1N_1 from R_1N_1, we have R_1Q_1 which is the average surplus income per man earned by the firm. The total surplus income will be R_1Q_1 multiplied by the total men employed, or the area of the rectangle $W_1Q_1R_1P$ which represents abnormal profits of the firm. This means there is only partial equilibrium and not full equilibrium because the firm's marginal revenue product equals its marginal cost or the marginal wage but the industry is not in equilibrium due to abnormal profits earned by the firm. As a result of abnormal profits, new firms will enter the industry and thereby increase the supply of the commodity, and therefore the product of the industry as a whole, and reduce the price in the market. Thus, with the fall in the price, the revenue product of labour will decrease and therefore the average net revenue productivity curve will shift lower down and will become tangential to the new wage line W_1W_1 at Q_1. When the average net revenue productivity curve thus shifts lower, the average net revenue product will be equal to the average wage or the average cost of labour. The surplus R_1Q_1 will be eliminated. Therefore, profits will again become normal. Another alternative explanation for profits to become normal is, with an increase in the number of firms the demand for labour from the industry as a whole will increase so that the average wage will rise from OW_1 to OW, and the wage line will move up. Hence as the wage line moves up the abnormal profits will disappear because the wage line will be tangential to the average net revenue productivity curve.

In either case, whether the price of the product of the firm or industry falls or the wage of labour rises, in the long run, normal profits are restored and the industry will attain full equilibrium.

W_2W_2 shows the new higher wage If ON men are employed at OW_2 wage, then profits will be less than normal as the average net revenue product of labour is less than the average wage the average net revenue product being RN and the average wage being R_2N There is therefore, excess of cost over revenue When subnormal profits are earned, such firms will leave the industry so that the supply of the product of the industry decreasing, the price of the product will rise and hence the average net revenue product curve will shift and will become tangential to W_2W_2 at R_2 and again the average net revenue product equals the average wage and profits will be normal, and alternatively, due to the departure of some firms consequent on sub-normal profits, the demand for labour will decrease and the demand curve W_2W_2 will move down to WW and will become tangential to the old average net revenue productivity curve at R Thus, either because of a rise in the price of the product or the fall in the average wage and the cost of labour, normal profits will be earned and full equilibrium restored Summing up, an entrepreneur of a firm will continue to employ more and more units of a factor till the marginal revenue product and the marginal cost of the factor are equal Applying these principles to labour, he would take on more workers until the marginal revenue product of labour equals the marginal wage Under Perfect Competition normal profits will be earned in the industry and the industry will be in full equilibrium when the average net revenue product equals the existing wage Thus, the volume of employment offered by a firm depends on its marginal productivity i e the demand for a factor is governed by its marginal productivity Our discussions so far have been with regard to the demand for factors by individual firms when the prices of these factors are given

The question then arises, how is the price of a factor itself fixed?

Generally the demand for the factor and the supply of the factor in reference to an industry as a whole determine its price Under Perfect Competition, the price of a factor is assumed to be given and any change in the demand of the individual firm cannot affect the price of the factor But the demand of the industry as a whole should affect its price and conversely, the price of the factor would affect the demand of

individual firms and the total demand of the industry In conjunction with a given supply of a factor the demand for it would determine its price In regard to labour, the rate of wage thus depends on the demand schedule and supply schedule of labour or the shape of the demand and supply curves of labour We shall make certain assumptions with regard to supply of and demand for labour to simplify the analysis 1 the total supply is fixed 2. labour is specific to that industry making it immobile On the basis of these assumptions, the supply curve of labour will be a vertical straight line

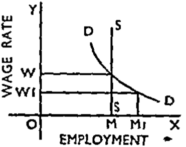


Figure 107

To discover the demand curve which is the same as the marginal revenue productivity curve let us assume that the industry consists of 12 identical firms and in each case the demand for labour will increase with a fall in the wage, shown by the demand curve *DD* Thus at *OW* wage *OM* men will be employed, at OW_1 wage, OM_1 men will be employed Due to the fall in the wage from *OW* to OW_1 there is an increase in employment in the firm from *OM* to OM_1 men, i e. by MM_1 men If all the 12 firms were to employ *OM* men at *OW* wage and OM_1 men at OW_1 wage, the employment in the industry will increase or the demand for labour in the industry as a whole will increase Here in this diagram *DD* shows the demand curve of one firm To show the demand for the industry composed of 12 identical firms, the following diagram may be drawn The diagram will represent the demand curve of the industry as a whole

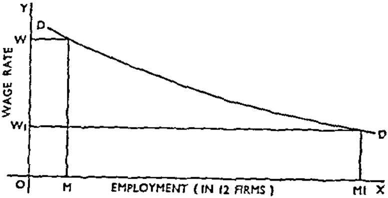


Figure 108

This is the demand curve of the industry which is derived by adding the demand curves of the firms Therefore in an industry as a whole at *OW* wage, if previously *OM* men were employed, at OW_1 wage OM_1 men will be employed (MM_1 in the diagram is 12 times MM_1 in the previous diagram) The significant point is that the demand curve slopes downwards to the right both for individual firms and the industry as a whole Therefore, if the demand curve thus slopes downwards and a larger labour force is employed at a lower wage and the supply of labour is known, the rate of wage is got by the inter-

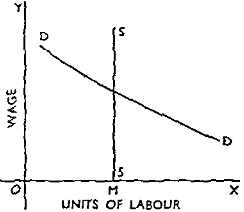


Figure 109

action of supply and demand or the intersection of supply and demand curves.

The supply curve *SS* and the demand curve *DD* intersecting at a point will show the rate of wage. Thus the price of a factor itself depends on the forces of demand and supply and the employment of a factor depends on the marginal productivity of a factor.

A different situation exists where perfect competition is absent, both in the factor market and the product market. This means that in the factor market the firm is the sole user or employer of the factor, i.e. it is a monopsonist and in the product market the firm is a monopolist. When the firm is a monopsonist in the factor market, the total demand for the factor is identical with the demand of the monopsonist. Hence the price of the factor will be governed by the demand for the factor on the part of the monopsonist and the supply of the factor. If the wage is fixed by the supply of and demand for labour, the demand for the factor, as under perfect competition, depends on marginal revenue productivity of the factor, or the marginal revenue productivity of labour here. In the product market the price of the firm's product unlike under perfect competition will not be given or fixed. It will vary with the output, a larger output selling at a lower price and a smaller output at a higher price. This factor of varying price in monopoly causes complications in calculating the marginal revenue product of a factor. Under perfect competition in the product market where the price is constant the marginal revenue product is got by multiplying the marginal physical product with the price of the product. Under monopoly since an increase in output involves a decrease in price the marginal revenue product cannot be got by multiplying the marginal physical product with the price but by multiplying the marginal physical productivity with marginal revenue. For example, in perfect competition suppose an additional worker produces 10 umbrellas, every umbrella selling at Rs. 10, the marginal revenue product is Rs. 100, (10×Rs. 10). Thus the price of the marginal physical product is Rs. 100.

Under monopoly, suppose 100 umbrellas sell at Rs. 10. By adding one more worker to the labour force 110 umbrellas are produced. 110 umbrellas cannot sell at Rs. 10, but at

Rs 9 50 What is the addition made to the total revenue by an additional worker? The marginal revenue is Rs 45

Under monopoly, thus, marginal revenue product is not the same as the price of the marginal physical product This happens due to the fact that the price is given under perfect competition but it has to be changed under monopoly, and under monopoly, as a result of the fall in the price caused by an increase in output the marginal revenue product decreases as output is increased and, consequently, the marginal revenue productivity curve slopes downward to the right and the slope of the curve is steeper than under perfect competition The marginal revenue productivity curve is the demand curve of the factor (labour here) Again, in the matter of the supply of the factor, under perfect competition for a given firm, the supply curve is a horizontal straight line, since a firm can employ more or less of the factor, such as labour, at the same price

Under monopsony where the firm is the sole employer of the factor the supply of the factor varies with the price, i e a larger supply will be forthcoming at a higher price and a smaller supply at a lower price Hence, the supply curve slopes upward to the right showing that greater employment would be possible at higher prices, that is to say, the average wage must increase when the demand for the factor increases and the average wage will be lowered when the demand is less In Perfect Competition in the factor market, since the wage of labour is given, and any amount of labour may be employed at that wage and the average wage is represented by a horizontal line, the average wage and the marginal wage will be equal Under monopsony, on the other hand, when the demand for labour increases and the average wage rises and the average wage curve slopes upwards, the marginal wage must be above the average wage Thus, under monopsony, the marginal wage curve will be above the average wage curve, unlike under perfect competition, where the average wage curve and the marginal wage curve will be the same It is important to note that in monopsony the marginal wage refers to the addition made to the total wage bill by employing additional units of labour by offering a higher average wage to the entire labour force Marginal wage does not mean the wage paid to a marginal worker because it is the same as the wage paid to the

other workers, i e when an additional worker is employed, the rate of wage, the average wage, must uniformly increase for all the workers The relationship between the average wage and the marginal wage is shown in the following diagram:

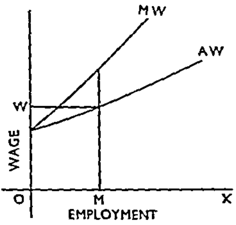


Figure 110

When *OM* men are employed, the average wage is *OW* but the marginal wage is greater than the average wage Geometrically, we may explain that average wage curve cannot rise unless the marginal wage curve is above it. Marginal wage here refers to the addition made to the total wage bill by the additional worker

This is the relationship between the average wage and marginal wage under monopsony We have thus derived the curve for labour under monopsony which is the same as the marginal revenue productivity curve. Using these curves, the marginal revenue productivity curve for labour and the average wage curve for labour, we can determine the equilibrium position of the monopsonist monopolist in the product and factor market as shown below ·

Here we have the demand curve for labour represented by the marginal revenue productivity curve *MRP*, showing a decrease in marginal revenue product with an increase in employment. The average wage curve is the supply curve show-

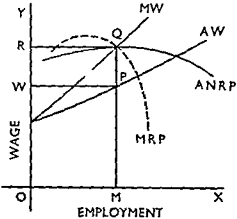


Figure 111

ing an increase in employment at an increased average wage *ANRP* is the average net revenue productivity curve The marginal revenue product curve passes through the average net revenue product curve at the highest point of *ANRP* *MW* is the marginal wage curve Equilibrium is achieved by the firm when *OM* men are employed because when *OM* men are employed, the marginal revenue product and the marginal wage are equal at *MQ* When marginal cost equals marginal revenue, the firm could maximise its profits (Here the firm is a monopsonist) Therefore, the monopolist will maximise his profits when his marginal wage equals the marginal revenue productivity of labour But while maximising profits the firm earns abnormal profits since the average net revenue product is higher than the average wage, the average net revenue product being *QM* and the average wage *PM*, so that there is a surplus of *QP* per worker Therefore, the total surplus from *OM* men, i e the entire labour force is $QP \times OM$ or *WP* or the area of the rectangle *WPQR* This rectangle, therefore, represents abnormal profits earned by the monopsonist due to the surplus accruing from the factor labour If we recall the situation under perfect competition in the labour market, the average wage line *WW* which is a horizontal line was tangential to the average net revenue productivity curve and hence the average wage was equal to the average net revenue pro-

duct, i.e there was no surplus and hence profits were normal

An important conclusion from this is that the firm by virtue of its monopsony in the factor market can make profits above the normal while under perfect competition profits are normal

We shall first make a comparison between a producer who operates as a competitor both in the factor market and the product market and a producer who is a monopsonist in the factor market and a monopolist in the product market These differences between the two situations in the market both for the product and the factors arise from what we have already said. Under perfect competition the price of the product in the product market is given while under monopoly it varies as output, rising as output falls and falling as output rises The effect of this change in price on the marginal revenue product of the factor is that it falls more rapidly than when the price of the product is constant Under perfect competition the marginal wage curve for labour which is the same as the average wage curve is a horizontal straight line Under monopsony, on the other hand, the marginal wage curve slopes upward to the right, and lies above the average wage curve because an increased demand for labour causes a rise in the average wage and at a lower average wage demand must be less Under perfect competition, when the firm is in equilibrium, the marginal revenue product of labour equals the marginal wage But the marginal wage is equal to the average wage Hence the marginal revenue product of labour will equal the average wage Under monopsony the marginal wage is more than the average wage Therefore the marginal revenue product of labour must be more than the average wage since the marginal revenue product equals the marginal wage under the equilibrium of the firm Under Perfect Competition, in the product market, the marginal wage equals the marginal revenue product of labour But since the marginal revenue product of labour equals the price of the marginal physical product of labour, the marginal wage must equal the value of the marginal physical product. On the other hand, under monopoly, in the product market, the marginal revenue product of labour is less than the price of the marginal physical product of labour These are the basic differences between Perfect Com

petition in both the markets, i e the product market and the factor market, and monopsony in the factor market and mono poly in the product market

VI MONOPOLISTIC EXPLOITATION

This leads us to what is called the Monopolistic Exploitation of producers when they are monopsonists in factor markets and monopolists in product markets By means of their monopsony power in the factor markets and monopoly power in the product markets, they benefit in two ways by exploiting factors in the factor market and consumers in the product market and thereby earn abnormal profits In the factor market the average wage paid by the employer will be less than the average net revenue product of laobur Hence the revenue due to labour will be more than the cost of labour and the employer enjoys a surplus But under perfect competition in the factor market the average wage of labour equals the average net revenue product of labour Graphically, the average net revenue product curve is tangential to the average wage curve which is a horizontal straight line Under monopoly the aver age revenue or price will be above the average cost, yielding a surplus revenue to the monopolist Under Perfect Competi

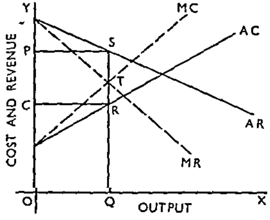


Figure 112

tion, average revenue equals average cost leaving no surplus Therefore, a producer as a monopsonist can keep the price of a factor below its average net revenue product. In the product market as a monopolist he can raise the price of the product above the average cost. *It is this feature of firms which is described as monopolistic exploitation of firms* We shall show by constructing a set of diagrams, the abnormal monopoly profits earned by a monopsonist monopolist. In the product market, the equilibrium of the monopolist may be shown in terms of the cost of and the revenue from the product.

MC is the marginal cost curve, *AC*, the average cost curve, *AR*, the average revenue curve and *MR* the marginal revenue curve.

The marginal cost curve and the marginal revenue curve cut each other at *T* Therefore *T* represents equality between marginal cost and marginal revenue When there is equality the output is the best in the sense that it maximises the profits. *Therefore the monopolist produces OQ output to equalise* marginal cost and marginal revenue when his profits will be maximum. But these profits are abnormal profits because his average revenue is above his average cost, the average revenue being *SQ* for *OQ* output, and the average cost *RQ* for *OQ output* and the surplus revenue *is SR*. Therefore, the

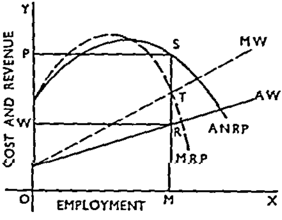


Figure 118

total surplus revenue=$SR \times$ output OQ or CR which is the same as OQ, that is to say, the rectangle $CRSP$. This is how the monopolist in the product market earns abnormal profits because of the excess of revenue over cost We may represent diagrammatically the surplus profits due to monopsony in the factor market in terms of the cost and revenue of factors of production

Again the employer in the factor market (here labour market) will be in equilibrium when he engages OM men because then his marginal wage and the marginal revenue product of labour will be equal at T, the point of intersection between the marginal wage and the marginal revenue product curves However, the profits of the firm are above normal since the revenue due to the factor exceeds the cost, in other words, the average net revenue product shown by $ANRP$ in the figure is more than the average wage shown by AW and the employer (producer) earns a surplus In the diagram, the average net revenue product is SM, for OM men and the average wage is RM Therefore, the surplus is SR. The total surplus is $SR \times OM$ or WR which is the same as OM or the rectangle $WRSP$ These two diagrams illustrate the monopolistic exploitation of firms We may draw separately diagrams indicating the cost and revenue First, therefore, for the product market

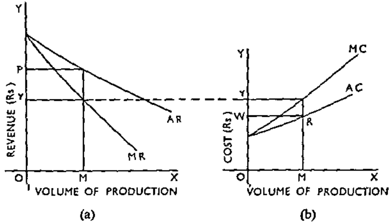


Figure 114

Both these figures represent a firm but each figure represents a different quantity; (*a*) represents revenue from the output of the firm and (*b*) the cost due to the output

Here we have separated revenue and cost. *OP* will be the price In the diagram (*a*) we have *MR* the marginal revenue and *AR* the average revenue and the output is *OM* Therefore, the average revenue is more than the marginal revenue, *AR* being above *MR* The dotted line joining the two figures shows the point of equality between marginal cost and marginal revenue in an equilibrium position of the firm The average revenue *OP* will be above the average cost *RM* Thus the surplus income or revenue of the firm will be (*PY* plus *YW*)×*OM* Therefore, we may show the equilibrium of a monopolist and the abnormal profits he earns in the market with these two figures

In the same way we can show the profits earned by the monopsonist in the factor market The following figures are again drawn for factor market As before they are drawn on the same scale showing that they both represent the same firm.

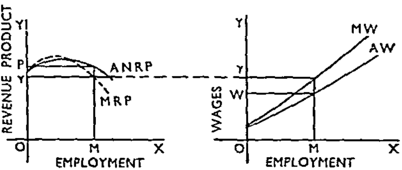


Figure 115

The dotted line shows the intersection of the marginal wage and the marginal revenue product curves. *OP* therefore represents the average net revenue product of labour *OY* will be the marginal revenue product and the marginal wage Similarly, the dotted line connects the marginal wage curve

with *MRP* The marginal wage and the marginal revenue productivity curves will cut at a point so that we have equality between the two showing the equilibrium of the firm But the average net revenue product exceeds the average wage It exceeds it by *PY* plus *YW* Hence the surplus earned by the producer equals (*PY* plus *YW*)×*OM* This would be the surplus income earned by the producer in a factor market These two combined would give the figure we have drawn before

So far we have worked out the principles underlying the employment of factors in general Basically one need not distinguish between factors land labour and capital as they are employed due to their productivity and the level of employment in regard to any factor depends on its marginal revenue product i e the demand for a factor of production is based on the marginal revenue productivity of the factor Given this marginal revenue productivity and the conditions of supply which govern the supply of the factor the price of the factor depends on the inter play of demand and supply However the general theory or principles of marginal revenue productivity influencing demand and the conditions affecting supply have to be modified in relation to different factors as they possess certain peculiarities which distinguish them from each other

With regard to labour the peculiar features which exert their influence on the volume of employment of labour are principally two (1) The fact that labourers can combine and form unions and bargain collectively for wages different from the ruling wage (2) Secondly since labour unlike capital and land has a free will workers can exercise their choice between work and leisure at any given wage In other words at higher wages workers may prefer shorter hours of work if they desire leisure in preference to work without however sacrificing their standard of living Collective bargaining on the part of workers and preference for leisure at higher wage levels are apt to affect the volume of employment The results of collective bargaining differ according to the situation in the market for the product and the factor labour

VII COLLECTIVE BARGAINING

Suppose a union demands a higher wage for its members, it, however, cannot make the employer employ the same number of workers as before, when asking for the higher wage The Trade Union which thus gets the employers to fix the wage at a higher level enjoys monopoly power since from the supply side of labour there is no free competition If, therefore, for an industry, the wage were fixed at a higher level than before, wages will be constant at that level and the wage line would be a horizontal straight line However, if we assume the demand curve for labour for a firm in the industry to be sloping downwards as it is identical with the marginal revenue productivity curve, a rise in the wage entails a reduction in employment, when the firm wants to maintain its profits at a maximum and it seeks a new equilibrium position

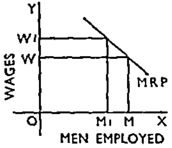


Figure 116

This relationship between the supply of labour and demand for labour is shown here At first the wage was *OW* rupees per week At *OW* *OM* men were employed and the firm was in equilibrium as the marginal revenue product was equal to the marginal wage which will be *OW* marginal wage being the same as average wage because the wage is constant and every additional worker has to be paid the same as before If the wage were raised by the action of the Trade Union from *OW* to OW_1, then if *OM* men were employed as before the marginal revenue product will be less than the marginal wage Hence, profits will be less In order to equalise marginal wage and marginal revenue product, the firm will be forced to re

duce its employment to OM_1 Then the marginal wage equals the marginal revenue product The firm will be making maximum profits Therefore, when a higher wage is demanded, there is a fall in employment provided other things are the same We shall discuss in some detail the results of collective bargaining, in four different situations

1 Perfect Competition in the factor market and product market
2 Monopsony in the factor market and Perfect Competition in the product market
3 Monopoly in the product market and Perfect Competition in the factor market
4 Monopoly in the product market and Monopsony in the factor market

Perfect Competition in the factor market means competition among firms for labour but due to the Trade Union's stipulation the wage is fixed In the product market with perfect competition the price of the product is given Any given firm would employ labour upto the point where its marginal revenue product equals the current wage because the current wage when it is constant will be the marginal wage and by equalising marginal revenue product and the current wage the firm will be in equilibrium making maximum profits But by Trade Union action if the wage were changed, the new wage might be higher or lower than the old wage or the same as the old wage If the new wage were equal to the old wage, the level of employment, other things being equal, would not change However, normally wages rise as a result of the claims of workers Then, as seen above, to keep up equilibrium, a firm will cut down its labour force to maintain equality between the new wage and the marginal revenue product of labour By how much employment would fall due to the rise in the wage depends on the slope of the marginal revenue productivity curve If the marginal revenue productivity curve is steep the fall in employment consequent on the rise in the wage will be less than if the marginal revenue productivity curve were flatter

Here we have two situations (A) & (B) A showing a steeper

demand curve than *B*, i.e. a steeper marginal revenue product curve, and as wage rises from OW to OW_1, the volume

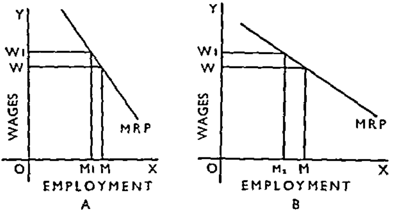


Figure 117

of employment decreases from OM to OM_1 i.e. the decrease in employment is by M_1M In *B* at OW wage OM men are employed while at OW_1 only OM_1 men are employed and the fall in employment is from OM to OM_1, i.e. the reduction in employment is by M_1M M_1M is greater than M_1M As a result of the higher wage there are two possibilities (1) They might consent to employ as many men as before even at the higher wage by sacrificing their profits, i.e. to say by earning less than normal profits but in the long run to attain equilibrium the firms would reduce employment, (2) Secondly, in the long run due to sub-normal profits the marginal firms or the less efficient firms may go bankrupt which would result in unemployment. Either way, a rise in wages must result in unemployment. The effect of such unemployment in the factor market would have its repercussions in the product market where the price is given but if unemployment were considerable and the decrease in the supply of product were considerable, the equilibrium price in the product market would slightly rise If the price rises in the product market the marginal revenue product of labour will move to the right.

Thus, as shown here, the new marginal revenue product curve will be to the right of the old marginal revenue product

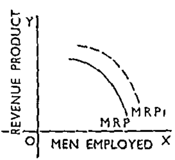


Figure 118

curve When the marginal revenue productivity curve thus shifts to the right the fall in employment is offset to some extent Therefore, the reduction in the volume of employment would be less than if there were no rise in the price in the product market

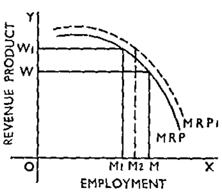


Figure 119

Again at OW, OM men are employed But when wages rise to OW_1 OM_1 are employed so that unemployment is M_1M If, *however, the price of the product should rise in the product* market, then the marginal revenue product will increase at each level of employment shown by the new marginal revenue productivity curve, MRP_1 Therefore, at OW_1 wage the firm will be

in equilibrium by employing OM_2 men Thus due to the rise in the price of the product and the shift of the marginal revenue product curve to the right, the fall in employment would be M_1M instead of M_2M, i e if there had been no rise in price due to the rise in the wage, unemployment would have been greater

Among different situations that might arise we have dealt with Perfect Competition both in the product market and the factor market The second situation is Monopsony in the factor market and Perfect Competition in the product market. Such a situation is shown by the following diagram

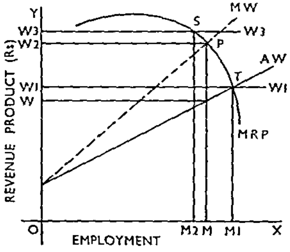


Figure 120

We assume first that the firm being a monopsonist or the sole buyer of labour must vary the wage according to its demand for labour, i.e it must offer a higher wage for a larger number of men than for a smaller number so that the average wage is shown by an upward sloping average wage curve (AW) Since the average wage varies with employment the marginal wage will be above the average wage and it is shown by an upward sloping marginal wage curve (MW) which lies above the average wage curve Then the firm would employ OM men in order to be in equilibrium and thus make maxi-

mum profits, i e when OM men are employed the marginal revenue product and the marginal wage will be equal as shown by the intersection of the marginal revenue product and the marginal wage curves at P Now suppose, by Trade Union action, a higher wage at OW_1 is fixed Whatever the employment of labour, the same wage would rule Hence the wage is now represented by a horizontal straight line W_1W_1 This is similar to Perfect Competition in the labour market or the factor market because with Perfect Competition in the labour market the average wage will be constant for any volume of employment and the wage line will be horizontal When OW_1 wage is fixed and the wage line W_1W_1 is a horizontal straight line, the marginal wage will be the same as the Average wage, that is to say, marginal wage will be OW_1 which is the average wage When the marginal wage is OW_1 and OM men are still employed, the marginal revenue product which is OW_2 will be more than the marginal wage, the marginal revenue product being OW_2 and marginal wage OW_1 Therefore, profits are less than maximum Once again to maximise profits, the firm's marginal wage must equal the marginal revenue product labour, i e the marginal wage curve and the marginal revenue productivity curve should intersect Therefore, the firm will now have to employ OM_1 men to attain equilibrium Thus, when the average wage increases from OW to OW_1, the volume of employment expands because the marginal wage of the firm, after the new wage has come into force, has fallen from OW_2 to OW_1 To equalise marginal revenue product of labour with the new marginal wage, the firm must employ more workers As more workers are employed, the marginal revenue product of labour will fall, i e the firm moves down the marginal revenue product curve from P to T Let us now introduce a higher wage OW_3, as the new average wage, fixed by the Trade Union Then OW_3 will be the average wage for whatever employment Thus OW_3 will also be the marginal wage If the firm should still employ OM men, the marginal revenue product will be OW_2 but the marginal cost or marginal wage will be OW_3 Therefore, the marginal revenue product will be less than the marginal wage Hence, the firm's profits will be less than maximum because marginal wage and marginal revenue product are unequal To equalise the two.

which can be done by raising the marginal revenue product upto the level of the marginal wage, the amount of employment should be reduced from OM to OM_2. Then the marginal wage and marginal revenue product of labour will be equal at OW_2, shown by the intersection of the wage line W_2W_2 and the marginal revenue productivity curve at 'S'

From this we may make the generalisation that so long as the wage fixed by the Trade Union is below the original marginal wage of the firm, a rise in the average wage leads to an expansion in employment. For example, when the average wage rises from OW to OW_1, since OW_1 is less than OW_2, employment increases from OM to OM_1. If, however, the new average wage were to be above the old marginal wage, the rise in the average wage leads to a contraction in employment, for example, if the new wage were OW_3 and therefore above the original marginal wage OW_2, employment falls from OM to OM_2. The conclusion, therefore, is that with monopsony in the factor market and Perfect Competition in the product market, a rise in the average wage may be accompanied by an increase in employment instead of a decrease in employment.

The third situation is Monopoly in the Product market and Perfect Competition in the Factor market

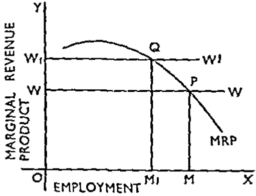


Figure 121

The fact of monopoly in the product market means that the

firm will vary the price of its product with the volume of output unlike under perfect competition A large output necessitates the lowering of the price so that the marginal revenue product of the factor, labour, falls more sharply than it would under Perfect Competition Under Perfect Competition even if the price does not fall for a larger output, the marginal physical product of labour due to law of diminishing returns will fall and hence the marginal revenue product will fall But the fall in the marginal revenue product would be less than under monopoly With perfect competition in the labour market the average wage will be constant for any volume of employment If the average wage is constant, it will also be the marginal wage Thus when the wage is *OW* the firm could employ *OM* men and be in equilibrium earning maximum profits because at that level of employment the marginal wage and the marginal revenue product of labour will be equal When the wage is raised from *OW* to OW_1 by the Trade Union, the new average wage will be OW_1 and once again since OW_1 will be the wage for any volume of employment, OW_1 will be the marginal wage The marginal wage, therefore, after the rise in the average wage, will equal the marginal revenue product when OM_1 men are employed, i e the marginal wage line W_1W_1 will cut the marginal revenue product curve at *Q* when OM_1 men are employed Again, therefore, the firm would be maximising its profits If however, at OW_1 wage the firm were to employ as many men as before, i e *OM* the marginal wage, OW_1 will exceed the marginal revenue product of labour *PM*, or, the marginal wage will be above the marginal revenue product To raise the marginal revenue product to the level of the new marginal wage, OW_1 it is necessary to diminish employment from *OM* to OM_1 men This situation, i e monopoly in the product market and perfect competition in the factor market, is similar to the situation with Perfect Competition in both markets seen above

The fourth situation is Monopoly in the Product market and Monopsony in the Factor market

The assumption of monopsony in the labour market implies that the average wage curve rises to the right and even so the marginal wage curve which lies above the average wage curve and the firm will be in equilibrium when *OM* men are em

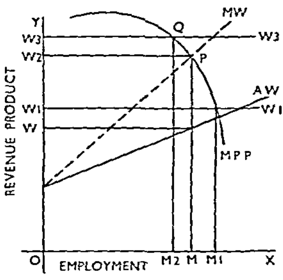


Figure 122

ployed since then the marginal wage will equal the marginal revenue product of labour at OW_2, i.e. PM, P being the point of intersection between the marginal wage and marginal revenue product curves. If the wage now is OW, i.e. the average wage for OM volume of employment, the firm makes maximum profits. A rise in the wage from OW to OW_1 means that the new average wage will be constant for any volume of employment and therefore the marginal wage will coincide with the average wage at OW_1 and the wage line will now be horizontal whereas it was previously rising upwards to the right. Due to the wage line W_1W_1 being horizontal and the average wage and marginal wage being equal, marginal wage will now be OW_1 while it was previously OW_2. If the firm should employ OM men as before, the marginal wage will be less than the marginal revenue product, the marginal wage being OW_1 and the marginal revenue product OW_2 or PM. To bring down the marginal revenue product to the level of the marginal wage the firm would employ more workers and as more workers are employed, the marginal revenue product of labour will diminish and equal the marginal wage when OM_1 men are employed. As a result of the rise in the average

wage from OW to OW_1, caused by the Trade Union, employment increases by MM_1. If, however, the average wage were to rise above OW_2, the original marginal wage for OM men employed, employment will decrease from OM to OM_3. Here if at OW_3 wage OM men were employed, the marginal wage will exceed the marginal revenue product, the marginal wage being OW_3 or QM_2 and the marginal revenue product—PM. To raise the marginal revenue product to the level of the marginal wage, i.e. from PM to QM_3, some men must be dismissed and as the number of men decreases the marginal revenue product rises and equals the marginal wage. Hence with monopoly in the product market and monopsony in the factor market, generally a rise in the average wage leads to an increase in employment, so long as the new average is below the marginal wage at the original level of employment, i.e. OW_2 in the diagram for OM employment. But if the new average wage should exceed the marginal wage at the original level of employment, i.e. OW_2, there will be a decrease in employment. This is in its results similar to the situation seen above under monopsony in the factor market and perfect competition in the product market. One difference, however, between this situation and the one in the monopsony in the factor market and perfect competition in product market is that under perfect competition in the product market, the marginal revenue product curve would be less steep in its fall. It would be steeper under monopoly in the product market. When the marginal revenue product curve is less steep the increase in employment would be greater.

The introduction of collective bargaining thus affects the level of wages and volume of employment in different ways in different market situations.

VIII SUPPLY CURVE OF LABOUR

We shall now consider the second factor or the second influence governing the supply of labour, i.e. the fact that the labourer might choose to put in more or less hours of work per week, according to his taste, depending on variations in the weekly wage, that is to say, one may work more and more as

the wage rises We may perhaps be departing from reality in assuming that the worker has this freedom to fix his own working day because the contract binding the worker enforces certain number of hours that must be worked but for simplicity of analysis we may assume that the worker can thus work more or less If, therefore, the amount of labour provided by a worker varies with the wage, the supply of labour as a whole will be elastic, changing in response to changes in the wage Hitherto, while discussing the demand for labour, both for a firm and an industry, we assumed inelastic labour supply and as such the supply curve of labour was a vertical straight line denoting, in the short period, a given supply OM at whatever wage OW, OW_1 or OW and so on But even if the

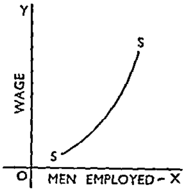


Figure 123

number of men or workers in the short run should be fixed or constant since they can put in greater or smaller number of hours of work, the supply of labour would be variable Then the supply curve would be upward sloping showing greater number of hours worked at higher wages and smaller number at lower wages The question then is whether an elastic supply curve sloping upwards to the right would always thus slope to the right, implying greater and greater supply, or the supply curve might change its shape Up to a point, it may be true that the supply curve slopes up to the right as wages rise, but it would not do so indefinitely Then, one alternative is that the supply curve beyond a certain point may slope up-

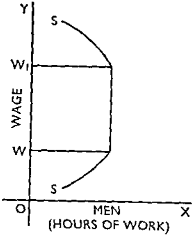


Figure 124

wards and further slope back to the left This means that as wages increase upto OW the supply curve slopes upto the right, indicating a progressive increase in labour supply but, if a wage should rise above OW, the supply of labour would cease to increase and remain constant till OW_1, i e between OW and OW_1 wage. Therefore the supply curve becomes parallel to OY and if wages should rise even beyond OW_1, the supply of labour will begin to fall so that the supply curve once again changes direction and slopes upwards to the left To explain such a supply curve of labour, we shall take into account the standard of living of a worker and include in his standard of living the element of leisure which would enable the worker to enjoy some goods which he would otherwise have to forgo, i e upto a point, the worker would value an increasing income in order to enjoy a higher standard of living or a greater volume of consumption, he can with an increase in his income afford a better diet, more house room and other essential supplies Once he has reached a desirable standard of living or level of consumption, as the wage rises he would not have any further incentive for more work Thus, he would respond to the increase in wages by reducing his volume of work, in order to enjoy leisure This leisure he could use to satisfy cultural wants patronising the arts by visiting the theatre

more often, or attending concerts, all of which involve time This behaviour of the worker is represented in the following diagram :

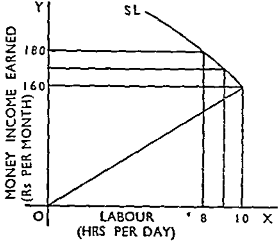


Figure 125

This figure of the supply curve, *SL*, as it is called represents a variable labour supply of a given worker Along *OY* is measured the money income per month and along *OX*, the supply of labour, measured in hours The curve, starting from the origin, slopes to the right showing that, to earn more and more income, the worker puts in more and more hours of work per day till his monthly income rises to Rs 160 But, beyond that, as he prefers leisure to work, as the wage increases, the number of hours per day diminishes from 10 to 9, 9 to 8 and so on, showing the second peculiarity which characterises labour as a factor This variation in labour supply is to be taken into account when dealing with the determination of the wage from the side of supply The fall in the hours of work due to the rise in the average wage does not necessarily have adverse effects on output Firstly, a rise in the wage provides a higher standard of living and thereby makes for a greater efficiency of labour Thus, the productivity of the worker rising, the output of the worker will increase, especially in poor countries with low living standards, this is likely

to happen Every increase in income would raise labour-efficiency Secondly, consequent on higher wages and lower number of hours, the output can increase, in the long run, as shown by variations in the working day in advanced countries A fall in the number of hours, instead of diminishing the output per week, has increased the output as a result of an optimum working day being established Therefore, both the worker and the industry might stand to gain when wages rise and supply of labour decreases In the short run, therefore, the normal tendency is for the supply of labour to increase with an increase in wage, and the supply curve therefore slopes to the right In the long run, even the number of workers can change due to the change in the size of population, and if the number of hours should increase with a rise in wages, together with a greater labour force, the supply of labour would be even more variable What should then be the shape of the supply curve of labour in the long run? It is difficult to determine because of the unpredictability of the size of the population In the early 19th century economists thought that the long run supply curve of labour tended to be a horizontal straight line This conception was based on the Ricardian Theory of wages called the Iron or Brazen law of wages according to which wages tend to remain at the subsistence level, and any departure from the subsistence level would invoke a change in the size of the population A rise in wages above the subsistence level would cause an increase in the size of families, and eventually the size of the population, and the consequent expansion in the supply of labour would depress wages till they once again drop down to the subsistence level A fall in the wages below the subsistence level would lead to a higher death rate, as a result of increase in proverty malnutrition, decreasing resistance to disease, and the supply of labour decreasing wages are pushed up to the subsistence level This theory was based on the assumption of a correlation between population and the wage level This theory has since been exploded as new trends in population have been discovered, such as that the growth in population is conditioned by the density of population, the standard of living of the community and the survival rate The rate of growth is inversely proportionate to the density and the wealth

capital and other factors is that capital is artificial, being man made, unlike land, labour and entrepreneurship which are gifts of nature Hence, the supply of capital unlike the supply of other factors is more elastic With regard to the pricing of capital, money capital is considered, although in production real capital in the form of instruments of production is involved Hence, the rate of interest or the price for the hiring of capital depends on the twin forces of supply and demand But, man controls capital better than the other factors Therefore, the supply of capital could be changed in response to the demand for it Nevertheless, problems of interest are apt to be more complicated Thus, capital as liquid capital or money capital is formed or accumulated through deliberate decisions made by people Due to these reasons, the Classical theorists could not provide a satisfactory theory of capital and interest to explain the pricing of capital, as a factor of production The origins of the modern theory of interest may, however, be traced to Senior, a Classical economist In essence, Senior's theory was based on the theory of value, i e the price of an economic good depended on supply and demand With reference to capital, interest which is the price for the use of capital depended on its supply side, on the willingness of consumers to save by abstaining from current consumption, and on its demand side, on the productivity of capital Therefore, the demand for capital was a derived demand being due to the demand for consumer's goods produced with capital and other factors Senior's theory was challenged by Marx on the ground that sacrifice is not universal since, in saving, the rich suffer little pain or sacrifice Marshall, therefore, preferred to call capital the product of waiting rather than sacrifice Further, the term, waiting, is more appropriate Even if a poor man saves at the expense of current consumption, the sacrifice is temporary and eventually he can enjoy his savings at a later date The term, waiting, is significant as it implies the element of time in the growth of capital The element of time enters in modern production of wealth, firstly because of waiting on the part of investors due to round about production, and secondly, the creation of capital itself takes time Therefore, the two peculiar features notable in capital are firstly, it is artificially produced and secondly, it involves time

These two characteristics influence the rate of interest although the rate of interest depends on the demand side of capital, on the marginal productivity of capital. A complication is introduced by the fact that decisions to save and decisions to invest are made by different people in a market economy or an exchange economy Only in an isolated or Robinson Crusoe economy and a planned economy these two sets of decisions may be made by one and the same person. In an exchange or an unplanned economy as they are separately made, a theory of capital and interest becomes complex Like other factors which, when combined with fixed factors of production, yield a diminishing marginal revenue product, capital, as a variable factor when combined with other fixed factors similarly yields a diminishing marginal revenue product. Once again, the element of time exerts its influence as capital in the form of instruments of production, such as machinery, is durable, having a working life ranging over many years Hence in employing capital, the employer has to estimate the productivity of capital over its working life, and secondly the creation of capital in the form of machinery itself involves investment of capital. Thus, capitalistic production or round about production, involving time makes the study of capital and interest more difficult. For example when a producer buys a machine say for £100 whose working life is a year and the machine can produce a given product, the interest on £100 borrowed for the purchase of the machine has to be calculated, keeping in view the durability of the machine and its marginal productivity The interest paid can approximately be the marginal product of the machine Under perfect competition, when a given rate of interest rules, the employer would add more and more machines till the marginal revenue product of the machine is equal to the rate of interest in the market. The marginal revenue product of capital as an asset is the prospective yield of the asset, in other words, the addition made to the total revenue by the use of the machine during its working life Therefore the relationship between the rate of interest and the prospective yield of the machine or the capital asset determines the level of employment of the asset. As in the case of other factors the employment of the factor varies as the marginal productivity of the factor—capital. If the marginal revenue

product or the net prospective yield falls with increasing employment of the asset, the demand for the factor, therefore, is represented by the marginal revenue productivity curve for capital The marginal revenue productivity or the demand curve slopes downwards to the right showing that at different rates of interest different amounts of capital will be employed The supply curve for capital slopes upwards to the right, showing that at higher rates of interest more and more capital will be forthcoming, as greater and greater sacrifices are willing to be made in response to the increasing inducement offered by way of interest, and the rate of interest is, therefore, determined by the shape of the demand curve of capital and the supply curve, as shown below

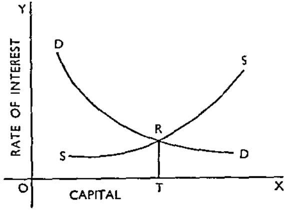


Figure 127

X RENT

Essentially, the theory of rent developed by David Ricardo early in the 19th century is still accepted Ricardo based his explanation of rent on two contentions that rents are the return for the use of the original and indestructible powers of the soil and high rents are earned due to the bounty of nature which was the contention of the Physiocrats which Ricardo refuted Let us take up the second of these arguments

To Ricardo rents are the result of scarcity of land relatively to the demand for it and this scarcity reflects the niggardliness of nature, and not her generosity Ricardo arrived at this con clusion from his experience of rising food prices in England, caused by increasing population and the Napoleonic wars Rents which arose on superior lands as against inferior lands were attributed to the fact of rising prices, due to increased demand for food, which caused the use of inferior lands, at higher costs of production. As regards the first that land yields a rent because of its original and indestructible powers it can not bear examination in view of the fact that land is no longer in its natural condition but has been completely transformed from pre historic times by improvements in agriculture through the investment of capital Thus, the product of land is largely the result of capital and labour besides the properties of the soil Again, land cannot be called indestructible as climatic changes may well alter the fertility of the soil, turn fertile re gions into arid wastes or, conversely deserts may be turned into fertile, smiling fields through artificial means Therefore, Ricardo's theory that land possesses original and indestructible powers is untenable But Ricardo's theory is true in so far as it points to the scarcity of land as a factor governing rent On the basis of this idea, we can discover what is called 'scarcity rent' arising on homogeneous land which is uniform in fertility and situation Due to the fixed supply of such homogeneous land rents emerge as demand increases. Unlike other factors, like capital and labour, the supply of land is inelastic and hence rents may be permanent phenomena Since the supply of other factors is elastic and therefore can be increased in the long run, the surplus earnings of such factors may vanish in the long run This concept of scarcity rent is important as it throws light on one important factor responsible for differences in rent due to increased demand The conclusion is that scarcity rent is the result of an inelastic supply of land If we drop this assumption of homogeneous land and consider heterogeneous land and take into account the differences in fertility and situation of different lands, differential rents arise, i e rents vary due to differences in location or situation and the productivity of the soil Differential rents are in the last analysis due to scarcity But they differ due to variations in land. In

other words, more fertile lands and more favourably situated lands from the point of view of accessibility to markets command rents which are higher than less fertile lands and less favourably situated lands Rents may be due to extensive cultivation or intensive cultivation in agriculture For example, if a colony of settlers in a new country occupy first the best land, as the population increases and less fertile lands are employed the superior lands yield a surplus income to cultivators, or if, to meet increased demand the same land were intensively cultivated through increased investments of capital and use of labour, due to diminishing returns the earlier investments yield surplus incomes This is because in extensive cultivation as inferior lands are cultivated the cost of production rises Hence, the production of the commodity at the extensive margin will be higher than it would be on superior lands But if all the output from the superior lands and the inferior lands were presumed to be homogeneous it would sell at one uniform price The price is fixed at the margin of cultivation in order to cover the marginal cost of production, i e the cost of production of cultivators on the worst lands But, since the cost of production on superior lands is less due to their superiority, such lands would earn more than the inferior lands Similarly, in intensive cultivation the cost rises with increased production Therefore, the last unit of the product would cost more than the earlier units of the product but the whole of the product assuming that there is demand for it would sell at the marginal price or the price that can cover the cost of production at the intensive margin of cultivation Thus the earlier units of the product, having been produced at lower costs sell at the same price as the marginal product and yield rent.

Suppose there are in extensive cultivation three grades of land *A B C* We will assume that *A* is the best land *B* is less fertile land and *C* the least fertile land Suppose the cultivator invests Rs 10 000 on *A* and it produces 100 000 srs Suppose *B* grade land will have Rs 10 000 of capital but because it is inferior to *A* it yields 80 000 srs Similarly *C* being the least fertile land would yield 50 000 srs What is the price at which wheat could be sold? The minimum price would be 10 srs per Re 1' It would cover the cost of production Sup-

pose we take *B* grade land But the yield will be less What is the rate at which they could sell? It would be 8 srs per Re 1/ Similarly, in the case of *C*, it would be 5 srs a rupee Thus the price would rise as inferior lands are brought under cultivation. One rupee could produce 10 srs, 8 srs, and 5 srs in the case of *A*, *B* and *C* lands respectively All the wheat must sell at that price which will satisfy the producers using *A* *B*, *C* lands In order that these 3 should be in the market the rate which should prevail in the market will be 5 seers a rupee What should be the income of cultivators using *A* grade land? At 5 seers a rupee, for *A* grade land the total income would be Rs 20 000, Rs 16,000 in the case of *B* and Rs 10 000 in the case of *C* The surplus revenue that goes to *A* would be Rs 10 000 This would be the rent in the case of *A* Rent would be Rs 6 000 in the case of *B* There is no surplus or rent for *C* as average revenue equals average cost. The same can be applied to intensive cultivation

We have been trying to explain that rents differ Differential rents are caused by differences in fertility—whether in extensive or intensive cultivation The conclusions which we might arrive at are (1) Rents are due to an increase in the number of farmers which in effect means an increase in the demand for land (2) Differences in the productivity of land so that those using more productive lands enjoy surplus incomes and (3) rents are due to rise in prices Here, for example, the price has risen from 10 to 8 and to 5 srs a rupee These are therefore the causes of rent What is true of difference of fertility is true of situations, especially of urban lands where situation varies from one site to another, as for example, in cities Hence, rents differ on urban lands as superior sites or more favourably situated sites yield larger incomes than inferior sites or less favourably situated sites Rents, therefore, are paid both for agricultural land and urban land Rent may be expressed in a different way as a surplus over transfer earnings.[1] For example, suppose a land can be put to different uses to grow different crops To retain such a land under the crop it must pay enough to prevent it from leaving that crop and being transferred to another crop If a wheat farmer pays £6 per acre of land as rent and a turnip farmer pays £4 per acre,

[1] *A Text Book of Economic Theory* by Stonier and Hague ch 13 1953

unless the wheat farmer pays at least £4 for the land it would be transferred to the turnip farmer Therefore, the £4 would be called the Transfer Earnings of the wheat farmer and the £2 over and above the minimum required to keep the land under wheat would constitute rent Another concept is rent of ability which relates to labour In case of certain types of labour, if such labour were scarce and inelastic in supply, surplus incomes accrue to those belonging to such occupations The supply of such labour is inelastic as natural ability cannot be produced at will Again this concept may be explained in terms of transfer earnings For example, a talented violinist might earn, say £80 a week, and as a member of an orchestra he could earn £20 In order to keep him from entering the orchestra he should earn at least £20 If his income as violinist should fall below £20 he is transferred Therefore, £20 would be the transfer earnings, i e earnings which he might earn by transferring himself while the surplus £60 would be his rent

Finally, we might extend the theory of rent, as developed by Ricardo in relation to land, to other factors, capital, labour and so on, which might resemble land in the short run in their supply, and being inelastic in supply, as demand increases, earn higher incomes which would be in the nature of rent and, therefore, called Quasi rent In the long run, however, as supply becomes more flexible and therefore increases, the surplus incomes disappear Such surplus incomes in the short run earned by factors other than land are like and unlike rent They are like rent in so far as they depend on inelastic supply in the short run just as land earns rents due to its inelastic supply They are unlike rent in being temporary, and short lived Hence the title, Quasi rent

Even as regards land the marginal productivity theory may be applied to show that the marginal revenue product of land may diminish and consequently the demand for land would decrease at higher rents and increase at lower rents But the application of the theory of marginal productivity must be modified according to the peculiar nature of land as distinct from other factors

ed, that is to say, no insurance company can possibly estimate the probable percentage of firms in the industry which may incur business losses Hence, unavoidable risks which must be borne by entrepreneurs call for an adequate compensation to recompense the entrepreneur The uncertainty is due to the inability of an entrepreneur to know in advance the probable demand for his commodity In this respect, therefore, the entrepreneur differs from an ordinary labourer or worker While an entrepreneur cannot count on getting his reward in the form of profits the labourer can be certain of his wage, unlike the other factors, labour, capital and land which, under contracts binding their employees, are paid their stipulated payments, the entrepreneur, being a residual claimant, cannot be certain of his income In estimating profits as a return for entrepreneurs, imputed items must be deducted from the gross profits or earnings Thus, an entrepreneur might represent several factors at once by providing some of the capital and some labour in addition to enterprise As such, his income will be made up of interest on his capital, wages for his labour and net profits for his entrepreneurship The imputed interest on his capital can be calculated on the basis of the market rate of interest on loanable funds and imputed wages again on the basis of alternative wages or wages of management, which he might have earned as a paid manager working for an employer But in his own business if he should, as a manager, coordinate the various factors and undertake risks, it is difficult to sort out his share in his income, i e his wages of management or pure profits Thus, in practice it is difficult to determine pure profits Applying the theory of marginal productivity to entrepreneurship in an industry, the number of entrepreneurs would depend on the marginal productivity of entrepreneurship even as the amount of employment of other factors, on their demand side depends on the prices of their factors If, therefore, in a given industry, the number of entrepreneurs varies, we can represent the demand and supply of organisers diagrammatically

We have the marginal revenue productivity curve which, as usual, slopes down to the right. Here the marginal revenue product of entrepreneurship is the profits which will be earned The supply curve is a horizontal straight line *SS*, as we assume

that all the firms in the industry are equally efficient and earn, therefore the same amount of profits when the industry is in

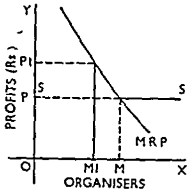


Figure 128

equilibrium and profits are normal, all the entrepreneurs, OM, would be earning Rs OP of profits because the marginal revenue product will equal the price of entrepreneurship On the other hand, if OM_1 entrepreneurs should be in the industry, the marginal revenue product would be higher than the normal profits, the marginal revenue product being Rs OP_1 and the normal profits OP so that OM_1 entrepreneurs would be earning abnormal profits and abnormal profits would attract new firms into the industry that is to say, the number of entrepreneurs will increase or the supply of enterprise will increase so that profits will come down to the normal

XII EULER S THEOREM[1]

It is in relation to the division of the product of industry among different factors of production that we have to deal with Euler's theorem The theorem of Euler explains the relationship *between the shares of different factors and what they produce*, i e their product. We have so far seen that the demand for a factor depends on its marginal productivity and the principle of marginal productivity was applied to various fac

[1] *A Text Book of Economic Theory* by Stonier and Hague, ch 16 1953

tors in determining the demand for them and their employment, keeping however, in mind the individual peculiarities of different factors Hitherto, each factor was treated in isolation and the relationship between its marginal productivity and its employment or demand was examined but, in practice several factors are used simultaneously and the rewards can be fixed if their marginal productivities could be determined One assumption which we shall make for determining the marginal productivity of each factor will be that all factors can be freely varied In reality, however, this is not true since certain factors have to combine in fixed proportions or not used at all For our analysis we must assume that there are no such factors i e we can freely change the amount of each factor in order to calculate the marginal productivity of the factor, the marginal productivity being the addition made to the total product when an additional amount of the factor is used while other factors co-operating with it remain constant Further, when hiring a factor we have seen that the employer will use more and more until the marginal revenue product of the factor equals the price of the factor So to understand the inter relation between the total product and the rewards of the various factors, we have to consider the marginal products of different factors On the assumption that all the factors are variable we can calculate the marginal product of a factor A by increasing it by a unit keeping the other factor B constant and similarly we can calculate the marginal product of B by increasing it by a unit, keeping A constant and the entrepreneur will add to A more and more units till he equalises the marginal revenue product of A with the price of A and similarly for B If the marginal revenue product of A could be calculated by increasing A and keeping B constant and the marginal revenue product of B can be calculated by increasing B keeping A constant, then the marginal revenue product of A plus the marginal revenue product of B will be equal to the marginal product of both A & B if both A & B are increased simultaneously by a unit each The marginal product when both A & B are increased at the same time may be called the combined marginal product of A & B In other words the sum of the marginal products of A and B would equal the combined marginal product of A & B This would be true when A & B are both

increased in small amounts because then the change in the proportions between A & B will be negligible and secondly, the change in the scale of operations will be negligible. This may not be true, however, if A & B are increased by large amounts, for example, if A were kept constant and B were increased by a large amount, the output may increase by 200 units Similarly, if B were kept constant and A increased by a large amount, again the total product will increase by 200 units But if both A & B are increased each by a large amount, then the combined marginal product of A & B may not equal the marginal product of A plus the marginal product of B, i e the combined marginal product may not be 400 units but more or less than 400 units This is due to an appreciable change in the scale of operations and the proportions of the factors To explain variations in output and the relationship between the marginal products of factors and the total product, we may consider first, the law of constant returns which is otherwise called a homogeneous production function or a production function which is homogeneous of the first degree This implies that when two factors are employed and they are both increased and the proportions between the factors are kept constant, returns to factors will be constant.

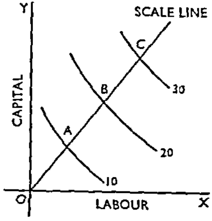


Figure 129

This is the diagram for the production function which is

homogeneous of the first degree showing that factors labour and capital are increased and the rate is kept constant and the increase in output is therefore constant

Returns are constant because the expansion of output is along the scale line showing that both the factors are varying in the same proportion The first proposition which we may lay down in the light of the relationship between the marginal productivity of the two factors is that the sum of the individual marginal products of any number of variable factors will equal their combined marginal product The second proposition is when returns to scale in any firm are constant and each unit of each factor is paid a reward equal to its marginal product the rewards of all the factors will equal the total product of the firm i e the marginal product of factor A multiplied by the number of units of A plus the marginal product of B multiplied by the number of units of B will equal the total product of the firm To prove this proposition suppose only one factor is involved and it produces the good and the increase in its product is proportionate to the increase in the factor i e the returns to the factor are constant at all levels of employment If returns are constant the average product will equal the marginal product The total product will be equal to average product multiplied by the units of the factor But since the marginal product in constant returns equals the average product the total product must equal the marginal product of the factor multiplied by the number of units of the factor In practice where at least two factors or more than two factors are used again we may calculate the marginal products of the different factors and their relationship to their total product Suppose an entrepreneur employs one factor labour then at one stage in the employment of the factor returns will be constant In perfect competition returns tend to be constant when the average cost of the firm is at a minimum or expressed differently when a firm is at the lowest point of its average cost curve in other words returns are constant when the average product of the firm is maximum Before the firm reaches its minimum average cost or maximum average product the average cost of the firm will be falling or the average product of the firm will be rising Beyond the point of minimum average cost or maximum average product the average

cost of the firm will be rising or the average product of the firm will be falling Before the firm's average cost begins to

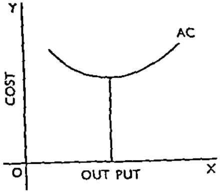


Figure 130

rise and after the average cost of the firm stops falling, over a range of output, the average cost or the average product of the firm will be constant. The average product can be constant only when the marginal product equals the average product The total product of the firm is the average product of the firm multiplied by the number of units of the factor But since under constant returns at the lowest average cost marginal product equals average product, the total product of the firm must equal the marginal product multiplied by the number of units of the factors, if, therefore, according to the marginal productivity theory, a factor is paid a reward equal to its marginal product, the marginal product of all the factors multiplied by units of factors must together equal the total product of the factors The marginal product of A plus the marginal product of B should equal the combined marginal product of A & B employed by the firm and the total product will be equal to the marginal product of A multiplied by the number of units of A plus the marginal product of B multiplied by the number of units of B Since marginal products of A & B are equal to their average products when the firm is in competitive equilibrium and producing at the minimum average cost, the proposition that the total product equals the marginal product of A multiplied by the amount of A plus the marginal product of

B multiplied by amount of B is otherwise called Euler s theorem

If returns to scale are increasing then the average product must be rising The average product can rise only if the marginal product is greater than the average product Then if the units of a factor of production are paid a reward equal to the marginal product the reward of the factor will be the marginal product of the factor multiplied by the units of factor The total product of the factor will be the average product of the factor multiplied by the units of the factor But since the average product is rising and the marginal product must be greater than the average product the reward of the factor will be more than the total product On the other hand if returns are decreasing the average product of a factor will be falling and the average product can fall only if the marginal product is less than the average product If all the units of the factor were paid a reward equal to their marginal product the share of the factor will be the marginal product multiplied by the number of units of the factor or the amount of the factor But the total product will be the average product multiplied by the number of units of the factor but average product as seen could fall only when the marginal product was less than the average product Therefore the share of the factor will be less than the total product The proposition called the Euler s theorem will not hold good when competition is not perfect It is applicable only under perfect competition

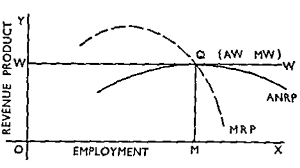
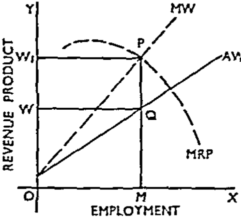


Figure 131

We have competitive equilibrium showing the reward of

labour which equals the marginal revenue product of labour at QM so that the reward of the factor is equal to the marginal product of the factor.



ther, one must approach the problems of employment and unemployment in a different way This method of dealing with general employment in the economy is called General Equili brium Analysis This approach is intended to explain unem ployment in general in all the industries In the past the Classical economists ignored mostly the question of unemploy ment and those who paid attention to the problem did not take it sufficiently seriously It was thought that general un employment was impossible Unemployment results from over production of goods But over production was impossible and hence unemployment The Classical economists were under the influence of J B Say's theory called "SAY'S LAW OF MAR KET" According to Say, supply always creates its own demand, and therefore demand and supply must be equal and when supply and demand are equal, there cannot be over production or unemployment It might be possible in a particular industry for the supply to outrun demand but in the economy as a whole such a possibility was rare James Mill thought that consumption was co-extensive with production and pro duction the sole cause of demand Whatever the amount of the annual production it can never exceed the annual demand David Ricardo subscribed to this view According to him in reference to a nation, supply can never exceed demand J S Mill shares the same view Only Malthus took a different view and said that demand could be less than supply and therefore lead to unemployment But he could not adequately prove his theory Due to this doctrine the Classical economists were generally optimistic and ignored the possibility of general un employment in society Till 1930, economists accepted the classical view and did not question Say's 'Law of Market' Then in 1936 J M Keynes wrote his 'General Theory of Em ployment Interest and Money" to refute the arguments of the Classical school In this book Keynes tried to establish his theory of general unemployment To Keynes full employment was a limiting case, similar to Perfect Competition or pure monopoly in a market Just as Perfect Competition and pure monopoly are ideals, full employment was an ideal In the actual world, under-employment is the rule and as such em ployment exists at various levels according to the needs of the industry and the supply of labour The reason why the Classi

cal economists did not consider general unemployment possible was that they extended their conclusions arrived at by applying their theory to particular industries to all industries together. In other words, they applied partial equilibrium analysis which might have been valid in reference to a certain industry to the entire economy. For example, if in an industry there should be *an oversupply resulting in unemployment*, by reducing the cost of production the price of the commodity could be reduced and demand generated so that an increased demand would be in equilibrium with the supply of the good. To reduce the cost of production, wages of labour could be cut and thereby the total cost of production could be brought down. Such a measure adopted in the case of one industry may prove effective because the industry forms a negligible part of the total economy. But if there should be over production in the economy as a whole leading to oversupply, such a remedy might produce the opposite results. Thus, to reduce cost of production in all the industries to lower the price or increase demand if wages were cut in all the industries, the purchasing power of labour would diminish and instead of demand increasing it would decrease and the gap between supply and demand would widen leading to even greater unemployment.

To correct the theory of the Classical economists, Keynes developed his General Theory of Employment to explain more *realistically causes of unemployment and remedies for unemployment*. An individual entrepreneur seeking to maximise his profits can offer a given amount of employment. Similarly, entrepreneurs taken together would offer that amount of employment which would maximise their profits. The volume of employment in an individual firm depends on the decisions of individual entrepreneurs and the volume of employment in the economy depends on the decisions of all entrepreneurs. To explain how the level of employment is determined, Keynes used two concepts *'aggregate supply'* and *'aggregate demand'*. At any given level of employment of labour the 'aggregate supply price' is the total amount of money which all the entrepreneurs in the economy taken together must expect to receive from the sale of the output produced by that number of men if it is to be just worth employing, that is to say, the aggregate supply price, when a given number of men is employed, is the

total cost of producing the output made by the number of men and unless the entrepreneurs can cover their costs when they employ, say X men, they will not find it worthwhile employing X men Therefore, they will offer less employment The 'aggregate demand price' at any level employment is the amount of money which all the entrepreneurs in the economy taken together expect to receive if they sell the output of those men Therefore, the aggregate demand price represents the expected receipts when a given volume of employment is offered to labour At each level of employment, therefore, there will be an 'aggregate supply price' and an 'aggregate demand price' in the economy, i e we can draw schedules for 'aggregate supply price' and employment, 'aggregate demand price' and employment, the 'aggregate supply schedules' showing receipts that entrepreneurs must receive to employ, profitably different numbers of men and the 'aggregate demand schedule' representing the expected results at different levels of employment On the basis of such schedules for the 'aggregate supply price' and 'aggregate demand price' graphs showing employment at different levels of 'aggregate supply price' and 'aggregate demand price' at different levels of employment may be constructed

Figure 133

This diagram illustrates how employment depends on the

'aggregate supply price' and 'aggregate demand price'. Along OY we measure receipts or proceeds in rupees and along OX, volume of employment. The curve AS is the Aggregate Supply Curve showing that at different levels of receipts so much employment would be possible. Thus, for example, if receipts are OM_1, then the volume of employment would be OR_1. In other words, it is just worthwhile employing OR_1 men. The curve AD shows expected receipts at different levels of employment. Thus, at OR_1 the expected receipts will be OM_2. Therefore, the minimum necessary for employing OR_1 men is OM_1 and OM_2 would be the expected revenue. At first, as income increases, volume of employment increases and finally, at one stage, the curve AS and AD intersect showing that OR men would be employed when the firm earns OM rupees. At this level of employment the expected receipts will equal the minimum receipts required to cover the cost involved in employing OR men. Until OR men are employed the curve AD is to the left of AS and this shows that the expected receipts exceed the receipts that must be enough for covering costs for employing a given number of men. Since expected receipts are above the minimum receipts it is profitable for employers to employ more and more men until the expected receipts coincide with the minimum receipts necessary to make it worthwhile to employ so much labour. But when more than OR men are employed, the curve AD lies to the right of AS. Hence expected receipts will be less than the minimum necessary for employing so many men, that is to say, until OR men are employed aggregate demand price is greater than aggregate supply price and more and more employment would be offered. When OR men are employed, the aggregate demand price and the aggregate supply price are equal. Therefore, the economy as a whole is in equilibrium. Beyond OR men, aggregate supply price will exceed aggregate demand price and profits diminish and employment would be reduced until once again the economy is in equilibrium. One important corollary of this proposition is that when the economy is in equilibrium, full employment may be absent.

This figure shows how equilibrium of an economy may be consistent with under-employment, i.e. absence of full employment. The economy will be in equilibrium when OR men are

employed and the aggregate supply price and aggregate demand price are equal at *OM*. However OR_1 men desire em

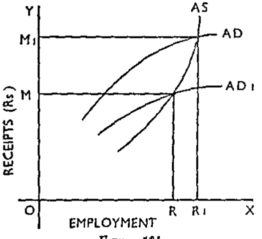


Figure 134

ployment and since *OR* men are employed RR_1 men are unemployed. They could be employed only if OM_1 amount of money is earned by the entrepreneurs or OM_1 money is spent by the community. If OM_1 amount is expected RR_1 men can be absorbed. Thus although the economy is in equilibrium when *OR* men are employed full employment does not exist. Hence the equilibrium of the economy does not necessarily imply full employment. If however there should be full employment when the economy is in equilibrium the economy will be in an optimum situation or the aggregate demand and aggregate supply are in an optimum relationship. Unemployment in this context refers to involuntary unemployment (as distinct from frictional unemployment which exists in the process of the movement of labour and structural unemployment caused by changes in industry and voluntary unemployment when workers do not want to work). Involuntary employment being unemployment of men belonging to all industries in the country who are willing to work but cannot find work. Frictional unemployment, structural unemployment and voluntary unemployment which may be confined to certain industries could be explained by partial equilibrium analysis but involun

tary unemployment which is general must be explained by general equilibrium analysis and it was such involuntary unemployment which was ignored by the Classical economists and to supply the deficiency in the field, Keynes provided his *General Theory of Employment.*

We saw how employment is governed by the aggregate supply price and aggregate demand price. Where the aggregate *supply price and aggregate demand price are equal, the economy* is said to be in equilibrium. This leads to another concept known as 'effective demand'. The phrase 'Effective Demand' refers to the actual demand in the market for goods. Only when the community actually buys the products of different industries producers can produce them and offer employment. Thus, ultimately the volume of employment in the economy depends on what the entrepreneurs expect to receive actually. Therefore, in a community effective demand represents the amount of money actually being spent on the products of industry. In *other words, it would be the amount of money received by the* industry which will be shared by different factors in the form of wages, interest, profits and rent. This would mean that effective demand implies the national income of the community or what the members of the community receive. Further, it would represent the value of the total output of the community since the value of the national output is identical with the receipts *of entrepreneurs from the sale of their goods.* The goods representing the total product of the industry are either consumption goods or investment goods. Hence effective demand would imply the national expenditure on consumption goods and on investment goods. Effective demand as we have seen equals the receipts of entrepreneurs. Therefore, these receipts must be from the sale of consumer goods and investment goods. *We may summarise these relationships as follows.*

Effective Demand = National Income
which = The value of national output
which = Expenditure on consumption *goods plus Expenditure on investment* goods
This would be = Receipts from selling consumption goods *plus receipts from selling* investment goods

We are therefore looking at the same thing from the side of the producer and the consumer Since effective demand equals volume of expenditure on consumption goods and investment goods and since employment depends on effective demand, employment must depend upon the expenditure on consumption goods and the expenditure on investment goods Therefore, we may infer from this that if expenditure on consumption should remain constant while expenditure on investment goods should increase employment will increase or if investment should be constant while consumption should increase again employment will increase Thus employment depends on the community's expenditure on consumption and investment, i e consumption goods and capital goods In order to increase employment one may either increase consumption or investment or both This was the theory of Keynes To understand how consumption or investment or both of these increase, we should know the inter relationships between consumption and investment and the factors governing these two Effective Demand depends not only on the expenditure of the community at large on consumption or investment but also on public expenditure or the expenditure of the State Thus, the total national output=Effective Demand, which may be equated with C plus I plus G where C stands for private consumption both of consumers goods and capital goods which were therefore called private consumption demand (Private expenditure on consumption), I represents private investment demand, i e to say Private expenditure on investment goods, and G represents government demand, i e (Govt. expenditure on consumption and investment goods)

Now, of these the size of the Government Expenditure (here represented by G) depends on the policy of the State which is conditioned by numerous factors political, social and economic In discussing the theory of employment, we shall confine ourselves to private expenditure on consumption and investment, ignoring Government expenditure Apart from government or public expenditure employment depends on the consumption and investment in the private sector As regards consumption, the volume of consumption in a country depends on the decisions of individual consumers i e the total consumption in the community equals the sum total of the consumption of indivi

at a higher rate of interest, consumption will be high, invest ment will be low Therefore, different individuals may react differently to the rate of interest Then, for a community as a whole the effects of the behaviour of different individuals will cancel each other out so that the net effect may not be much The inference from this, for Keynes, is that for the community in general, the rate of interest may not be an important factor governing consumption Hence, we might ignore the rate of interest Again, in the short run, subjective factors such as pride, avarice, miserliness, ostentation, generosity, extravagance, may be taken to be given so that we may assume that con sumption is not affected by these subjective factors Only in the long run, due to social, cultural and psychological forces, the consumption habits of people might alter and affect con sumption. In the short run, therefore, one may assume the objective and subjective factors governing consumption as given and proceed to consider the functional relationship between consumption and income If, therefore, consumption depends on the level of income, we might draw a schedule showing the propensity to consume of an individual and the community at different levels of income Such a schedule would help us to make some assumptions (1) As the community's income rises, its consumption also rises But if income rises by a given absolute amount consumption will rise by a smaller absolute amount, e g if income increases by a Rs 100, consumption increases by less than Rs 100 or when income increases, con sumption will increase but not by so much as income has increased (2) The second assumption is that people normally do not consume more than what they earn and (3) As a man's income rises, his marginal propensity to consume declines For example, a man with an income of Rs 400 may consume Rs 395 If his income rises to Rs 450 out of the extra Rs 50, he would consume only Rs 45, i e out of Rs 450, he would consume Rs 440 (395 plus 45) If his income should further rise by another Rs 50, out of the additional Rs 50 he would spend Rs 40 instead of Rs 45 as before Similarly, if he should earn an additional Rs 50, he would spend this time Rs 35 and so on Therefore, the propensity to consume dimi nishes as income increases and this may be called Diminishing Marginal Propensity to consume The diminishing marginal

propensity to consume may be shown in the form of a curve The diagram would represent an imaginary community which spends different amounts at various levels of income. The community's propensity to consume is got by considering the propensity of all individuals, i e by adding the individual schedules, we get the schedule of the community and the schedule shows the community's propensity to consume as income changes

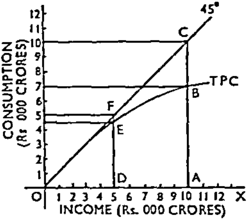


Figure 185

The line 45° shows how at each level of income the community is spending all the income without saving, i e upto Rs 3000 crores it spends everything it earns but beyond this the propensity to consume declines so that the decline in propensity to consume is shown by the Total Propensity to Consume curve, *TPC*

The Total Propensity to Consume curve represents the schedule of the total propensity to consume of the community For example, when the community's income is Rs 10000 crores it spends Rs 7000 crores, that is to say, it spends *AB* and it saves *BC* or Rs 3000 crores When the income is Rs 5000 crores i e *OD* (here) the consumption is Rs. 4500 crores—or *DE* and the saving is Rs 500 crores *EF* The curve at 45° or the straight line from the origin shows the total propensity to consume if the whole of the income is spent by the community

money spent by the State would be earned by the different factors of production employed in building the roads Therefore, the income earned by the factors will be spent on goods Hence, the demand for these goods would increase and to meet the increased demand, further production would be undertaken. As a result of the million pounds spent by the government, production and consumption will increase in the economy and the total output will increase and employment will increase The conclusion of this would be that total increase in national income due to expenditure on public works would be greater than the amount spent on the public works This indicates the relationship between the initial investment and the ultimate increase in national income and employment, i e the effect of an increase in investment is multiplied several times throughout the economy and this relationship between investment and total income is represented by the multiplier The multiplier compares the relative sizes of a given initial increase in investment and the total ultimate increase in income (income meaning output) The multiplier may be represented by the letter "*K*" just for convenience and it depends on the propensity to consume of the commodity If the propensity to consume is high, i e if the community spends a large proportion of its income on consumption, the multiplier would be larger If the marginal propensity to consume is low or if the community spends a smaller proportion of its incomes, multiplier will be smaller, e g. if the road builders, in the example above, should have a high marginal propensity to consume, they would spend a larger proportion of their wages on consumers' goods and this would provide greater employment and income to producers of consumers goods, like bakers, shoemakers and so on. On the other hand, if their marginal propensity to consume should be low or if they save most of their income, the demand for consumers' goods would not increase much and hence employment and incomes in consumers' goods' industry would be low If the marginal propensity to consume is zero which means that all the additional income would be saved, then the total increase in income will be equal to the increase in the income of the road makers (here say £1 million) This means that the payment of a million pounds to factors will not lead to any increased demand and increased employment and

income The multiplier K will be equal to one or unity which means the total increase in the national income is just as big as the increase in investment—here, a million pounds But in reality, the marginal propensity to consume can seldom be equal to zero, i e people would spend at least some of their additional income and when they spend a little of their income the demand for goods would increase to that extent, resulting in increased employment and increased incomes of factors in other industries Therefore, the increase in the total income of the community would be more than the initial investment. Hence, the multiplier K will be more than one, i e more than unity *This is only a limiting case*

Another possibility is marginal propensity to consume being equal to one, i.e not zero, which implies that the entire increase in income is spent on consumption, or there is no saving at all If, therefore, the marginal propensity to consume equals *one and all the income is spent, the demand would increase,* factors producing goods to meet the demand would earn more income and would again spend all their income without saving any so that the increase in income and employment may be infinite This means that the multiplier K would equal infinity *Again this is another limiting case The multiplier cannot* be=infinity or marginal propensity to consume cannot be=1

We have done with consumption which is one of the determinants of the volume of employment and, therefore, national output or the national income

The next determinant of employment is Investment. As we have seen employment depends partly on the expenditure on investment goods or simply the amount of investment undertaken. Now we should consider the various factors that govern investment itself In our analysis we shall leave out of account *government expenditure which is a part of total expenditure* because government expenditure could be arbitrarily decided, i e it is not at the mercy of economic forces as much as private expenditure is Then, if we confine ourselves to private expenditure we shall be concerned with the decisions of private *entrepreneurs on the amount of investment to be undertaken.* One thing that must be borne in mind in regard to investment is that investment is in new production, i e businessmen and firms purchase new assets in the form of factories, plant,

machinery and so on On what does such investment of capital depend? The businessman undertakes production by investing capital only if he can expect adequate money returns to his investment Thus one would invest his capital, say in a machine if he expects to earn enough money by selling the product due to that machine during its life, out of the gross revenue earned deductions for costs are made and what he gets would be his net return and the sum total of such net returns over a period of years is called 'the prospective yield of the asset' (here the machine) Thus, one consideration which would carry weight with the investor is the prospective yield of the asset Secondly, the investor has to pay the price of the asset (here, the machine) This is called the Supply Price which is the sum of money which he must pay in order that the producer of the asset may produce it The prospective yield and the supply price are both important in determining the revenue which the producer can earn by investing more and more capital in the asset Therefore what the entrepreneur expects to earn from one additional asset or machine is called the marginal efficiency of capital Thus, the investment of the entrepreneur depends on the marginal efficiency of capital Further, marginal efficiency of capital tends to decrease as more and more assets of the kind are employed, i e returns from additional machines would decrease progressively One reason for this is that as more and more assets are employed and the demand for the product of the industry is met by an increasing supply, the price of the product may decrease and hence the prospective yield may decline (here the prospective yield corresponds to marginal revenue product mentioned before) Secondly, the supply price of the asset may rise as the demand for the asset increases In the short period, the producers of the machine incur higher costs of production and charge a higher price for the machine Due to either of these reasons as investment increases, the marginal efficiency of capital falls and the amount of capital invested would depend upon the rate of interest for capital Investment would be carried upto the point where the marginal efficiency of capital equals the current rate of interest Then the firm would reach equilibrium or earn maximum profits from the capital invested The trend of marginal efficiency of capital is shown by the *MEC* Curve

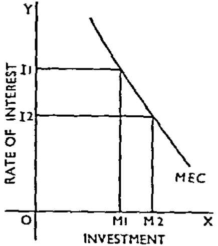


Figure 136

In this diagram the rate of interest is measured along *OY* and the volume of investment along *OX* and the curve *MEC* slopes downward to the right showing how at higher rates of interest the volume of investment is smaller than at lower rates of interest. Thus, at OI_1 rate of interest, the volume of investment is OM_1 and at OI_2 the volume of investment is OM_2. Thus the volume of investment depends partly on the rate of interest. A second factor governing the volume of investment is the volume of consumption because the demand for investment goods is derived from the demand for consumption goods and as such the demand for investment goods varies directly as the demand for consumption goods If there is greater consumption there will be greater investment. Therefore, the demand for investment goods depends on the rate of interest and the level of consumption expenditure In other words, investment is a function of the rate of interest and consumption. This relationship between investment on the one hand and consumption and rate of interest on the other can be shown in the form of graphs

The rate of interest is given. It is R_1 or OR_1 At this rate the amount of investment varies as the level of consumption-expenditure. Consumption-expenditure at different levels is shown by the curves E_1 E and E_2. When the level of consumption-

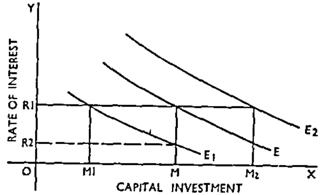


Figure 137

expenditure is the lowest, i.e. shown by E_1, the amount of investment at R_1 rate of interest is OM_1. As the consumption rises from E_1 to E at the same rate OR_1 or R_1, investment will be OM, i.e. greater than before and similarly when the level of consumption-expenditure is E_2 at R_1 rate of interest, OM_2 will be the volume of investment. Thus, although the rate of interest is the same if the level of consumption-expenditure changes, the volume of investment changes. Generalising we may say, at a given rate of interest, investment is greater at higher levels of consumption-expenditure and lower or smaller at lower levels of consumption-expenditure. Another conclusion from the diagram is that at a given level of consumption expenditure investment varies as the rate of interest, i.e. it is greater at lower rates of interest and smaller at higher rates. For example, on E_1 at R_1 rate, OM_1 of capital is invested. But at that level of consumption-expenditure to induce OM or a greater volume of investment, the rate of interest must decrease, say to R_2. Therefore the volume of investment depends partly on the rate of interest and partly, on the level of consumption-expenditure.

Among the factors which govern the volume of investment one is the rate of interest. Therefore, we shall now discuss how the rate of interest itself is fixed and how it, in its turn affects the demand for capital. If we define the rate of interest as the price at which loans of money are made then the rate of inte-

rest would depend on the supply of money and the demand for money like the price of ordinary goods which is governed by forces of supply and demand The supply of money or the quantity of money depends on the central bank and the banking system The demand for money again depends on the *Liquidity Preference* which in its turn depends on various motives underlying liquidity preference of which three are important. (1) Transactions motive, (2) Precautionary motive and (3) Speculative motive The amount of money held under the transactions motive and precautionary motive is dependent on *the level of income while the amount of money held under the* speculative motive depends on the rate of interest. Therefore, liquidity preference or the demand for money consists of two parts, (1) The first part is due to transactions motive and precautionary motive which may be represented by L_1 The second part is due to the speculative motive which may be called L_2 Thus, L_1 depends on the level of income and L_2, on the rate *of interest: L_1 depends on income Hence it may be called* the function of income L_2 depends upon the rate of interest, and hence it is the function of the rate of interest which we may call *l* Therefore, the total amount of money demanded $L=L_1$ plus L_2 Thus, the total demand for money depends on the level of income and the rate of interest. As the level of *income and the rate of interest vary, the demand for money*

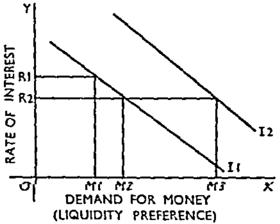


Figure 138

varies Now, the relationship between the demand for money and different levels of income and rates of interest may be shown as a schedule of Liquidity Preference and this schedule can be reduced to a curve

Along OY is the rate of interest and along OX, the amount of money demanded, and the relationship between liquidity preference and level of income is shown by this diagram

Here we have two curves, I_2 and I_1, each one representing liquidity preference at different rates of interest and at different levels of income The conclusions we may draw from the figure are that the community will hold more money at low rates of interest than at high rates when the income is constant Thus, at a given level of income, at R_1 rate of interest OM_1 will be demanded and at R_2 rate of interest OM_2 will be demanded, although the income is constant, the second conclusion is that at a given rate of interest more money is held when income is higher e g if the higher level of income is represented by I_2, at R_2 rate of interest, OM_2 is demanded When the income rises from I_1 to I_2, at R_1 rate, OM_1 is demanded Thus, the demand for money (liquidity preference) depends on the two factors, the rate of interest and level of income, just as the demand for a good depends on the price of a good But the price of the good itself is dependent on the demand for the good together with the supply of the good. Even so, the rate of interest, which is in other words the price of money, itself depends on the demand for money or liquidity preference and the supply of money, and when the rate is fixed, the demand and supply will be in equilibrium and, further, as the rate varies, the demand for money varies as seen above We are assuming that the supply of money is constant so that we may ignore the supply side of money

SUMMARY One fundamental assumption of Keynes on which he based his theory of employment called the General Theory was that the volume of employment depends on the income of the community which means the national output Therefore, employment is a function of income A large income in a country means a large volume of employment, a small income, a small volume of employment The income or output depends, as we have seen, on expenditure on consumption, (C) plus expenditure on investment, (I) plus expenditure on

consumption and investment (*G*) Income being represented by *Y* Therefore $Y = C$ plus I plus G but each of these, (i e consumption in the private sector and investment in the private sector and both consumption and investment in the public sector) depends on a number of factors

The two factors governing consumption are income and the marginal propensity to consume in the community

Investment depends on the rate of interest on the one hand and marginal efficiency of capital

The rate of interest in its turn depends on supply of and demand for money or liquidity preference

The marginal efficiency of capital is again dependent on two factors, the supply price of capital and the prospective yield

We are leaving out of account Government expenditure because Government expenditure is essentially independent of economic factors Government expenditure can be altered at will Government officials can change their policy Therefore, this shows how, ultimately, employment depends on income and income depends on consumption and investment in the private sector and the expenditure of the State

Assuming that there is unemployment what are the ways of decreasing it? In the last analysis, since employment depends on income, an increase in employment can be brought about through an increase in income and income may be increased by increasing consumption or investment in the private sector or government expenditure But consumption which is one of the determinants of employment itself depends on income Thus, in order to increase consumption income must be increased and income depends on other factors Thus, income may be changed through the propensity to consume as we have seen if the marginal propensity to consume is raised, which simply means if people are made to spend more money on consumption, then due to the multiplier effect throughout the economy the national income will increase But the propensity to consume in the community depends on the consumption habits of the community which are conditioned by the psychology of consumers and as such it is difficult to change the consumption habits in the short period and hence the propensity to consume is difficult to change The only possibility, an indirect one, of changing the marginal propen

sity to consume in the country as a whole, in this case to raise the marginal propensity to consume, as greater employment is desired is by transferring money from the rich to the poor by taxation As the rich have a lower marginal propensity to consume than the poor (which means that the poor spend more on consumption than the rich) when money is transferred from the rich to the poor, expenditure on consumption will increase and again through the multiplier effect, employment and income will increase in the economy The second alternative open to the country for increasing employment by increasing income, is by way of investment If expenditure on investment should rise, employment is created and more income will be earned which is spent on consumption, and therefore, cumulatively greater and greater employment and income will result Prof Keynes favoured the use of both these methods of raising income and employment To increase investment, we should take into account the rate of interest and the marginal efficiency of capital since the volume of investment depends on these two factors and the marginal efficiency of capital, as already seen, tends to decrease as investment increases Therefore, to induce greater investment the rate of interest must be lower or the marginal efficiency of capital should be raised The marginal efficiency of capital can rise if the prospective yield of assets rises or their supply price falls The supply price of an asset depends on the physical conditions of production in the industry producing the asset But in the short run physical conditions of production cannot be altered and therefore the supply price of the asset cannot be lowered Hence, the only method of increasing marginal efficiency of capital is to increase the prospective yield of capital and the prospective yield of capital depends on the future Therefore, it is uncertain In order to induce business men to increase investment they must be persuaded by the government that the future would be bright and the prospective yield of their investments would be high and this depends on the optimism or pessimism which is again a psychological factor which cannot be easily controlled Thus the Marginal Efficiency of Capital is difficult to change To increase investment therefore, the alternative weapon which is more amenable to control is the rate of interest which depends on the

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